INSIDE: "NICE CROAKER YOU CAUGHT THERE."

Montana Outdoors

MONTANA FISH, WILDLIFE & PARKS | $4.50

MARCH–APRIL 2023

"SHORB" GUIDE

EXPERT ADVICE FOR TELLING SHOREBIRDS APART

IN THIS ISSUE:

LIVING IT UP IN A DEAD TREE

MAKING WIND POWER WILDLIFE FRIENDLY

TURN VENISON BONES INTO SCRUMPTIOUS SOUP

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Montana Outdoors

MARCH–APRIL 2023

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SAUDI ARABIA OF WIND The Rim Rock Wind Farm near Cut Bank and dozens of others are turning Montana's infamous winds into electricity. See page 28 to learn how FWP is working with energy utilities to reduce harm to bats and eagles from the growing number of turbines. Photo by Sean R. Heavey.

COVER Known as the tuxedo bird, the black-necked stilt is one of 12 shorebirds we profile starting on page 36. Photo by Ken Conger.

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A breath of fresh air?

I love *Montana Outdoors* and usually sit down and read the latest issue cover to cover as soon as it arrives. For years it has been one of the few periodicals that we keep and use as "coffee table" reading material. Regarding your article "The Carrion Crews" (November-December, 2022), on the Montana Department of Transportation employees who pick up roadkill, I truly appreciate all their hard work. I couldn't help but think that they should be issued organic vapor cartridge respirators to better deal with the aroma. That would certainly be better than having to gasp for air and constantly pop breath mints, as mentioned in the article. I hope someone can help these crews get the proper equipment they need to perform their cleanup jobs.

Kevin Murphy
Whitefish

Watch for the second deer

Regarding your article "Carrion Crews": Each summer in Montana, we see many road-killed fawns. What I've seen happen so many times is that a driver will see a deer crossing the highway ahead and slow down to let it safely cross the road, and then speed up. And that's when the fawn, following the doe, runs out and is hit. It once happened to me, and it's a terrible feeling to accidentally kill a fawn with your vehicle. Please let your readers know of this situation so they will keep an eye out for the fawn after the first deer crosses. It happens more often than you might think.

Paul Stantus
Libby

Eating the box

Regarding your article "Death by Feeding" (November-December, 2022), A former Alaska park ranger once told me to imagine the diet of a moose as a box of cereal. Moose eat the "cereal" during the spring, summer, and fall, and then eat the "box" during the winter.

Merle Ann Loman
Victor

The
Carrion Crews
Thousands of deer and other wildlife are killed on Montana highways each year. Who picks up those carcasses, and what's being done to reduce the dangers to animals and drivers?

Miffy, Season 2

We loved "Miffy's state park adventure" (Outdoor Report, November-December, 2022). Please send our compliments to the wonderful staff at Lewis & Clark Caverns State Park.

Marta and Konrad Emerson
Grand Rapids, MI

Editor replies: Several readers wrote to express their delight in reading about the stuffed bear's week-long visit to the Caverns. Here are a few more photos of Miffy helping the state park crew by spraying herbicides on invasive weeds and driving a mower.

What's that grass?

Kudos on the fantastic special issue of *Montana Outdoors*: "The Next 100" (July-August 2022). What a great compilation, and such a tribute to the natural treasures of our state. In addition to learning to identify 20 tree species and 20 wildflowers, as offered in that issue, your readers might also want to learn to identify 20 of Montana's 158 native grass species. I'd recommend including Montana's state grass, bluebunch wheatgrass, as well as blue grama (the seed head of which looks like a human eyelash) and also needle grass, with its long, threadlike awn on a needle-sharp seed.

Beth Madden
Bozeman

Editor replies: Our readers may be interested to know that the College of Agriculture at Montana State University and High Country Apps recently teamed up to produce a Montana grasses and graminoids identification app for iOS and Android devices. The app provides images, species descriptions, range maps, flowering periods, and technical descriptions for over 260 mostly native grasses and grasslike plants (graminoids) inhabiting Montana and nearby areas of Wyoming, North Dakota, and Idaho. Find the $4.99 app at an online app store.

Good joke? A matter of opinion

In your November-December 2022 issue's "LOOKALIKES" feature, you listed the ways to tell the difference between a raven and a crow. I was once told that a raven has 17 pinion feathers, while a crow only has 16. So, the difference between a raven and a crow is a matter of a pinion. I don't know whether any of that is true, but it's a good joke.

Dan Buerkle
Plevna

CORRECTION

In the 2023 January-February Photo Issue, the butterfly image shown on page 38 is a two-tailed swallowtail, not a western tiger swallowtail. The wing detail on the back cover is also from a two-tailed swallowtail. ■

MONTANA STATE PARKS

Vietnamese Venison-Stock Noodle Soup

By David Schmetterling | Preparation time: 9 hours (stock) | Cooking time (soup): 65 minutes | Serves 4–6

SHUTTERSTOCK

Wild game is a precious resource, so I try to use as much of every harvested animal as possible—including the bones. The best use of bones is for making stock. Stock or broth (made from meat or vegetables) is the foundation for the world's most delicious soups. I developed my stock recipe (right) using the bones of deer, elk, antelope, or moose. The recipe below is for a noodle soup found throughout Vietnam that I learned to make during several visits. It makes great use of venison stock. ■

—David Schmetterling is the FWP Fisheries Research Program coordinator in Missoula.

Noodle soup

INGREDIENTS

32 oz. venison stock, 16 oz. water
¼ c. lime juice
5 star anise seeds
1 cinnamon stick
1 T. crushed coriander seed
6 whole cloves
1 yellow onion, chopped
1 t. MSG*
1 lb. rice noodles (often labeled as bún or pho noodles) or ramen noodles. If using dry rice noodles, soak in lukewarm water for 30 minutes before boiling (be careful not to overcook).
8–12 oz. thinly sliced venison steak
3 cloves garlic, crushed
2–3 T. vegetable oil (if stir-frying meat)

DIRECTIONS

Put the stock and water in a large pot and add the next seven ingredients (through the MSG). Let simmer 1 hour until aromatic and the chopped onion is soft.

Boil noodles in the soup (if using rice noodles, only for 1 minute).

Lift noodles from soup with pasta fork and place in serving bowls. Put the thinly sliced raw venison on top. Ladle boiling hot soup over the venison to quickly cook the meat. (Another option is to quickly stir-fry the venison with a bit of crushed garlic, fish sauce, vegetable oil, and hot peppers, and add that to the stock.)

Serve with heaps of fresh mint leaves, fresh cilantro leaves, bean sprouts, Thai or regular basil leaves, sliced hot peppers, and lime wedges. Season with fish sauce if you want more saltiness. ■

*Also known as "umami flavoring," MSG (monosodium glutamate) is a flavor enhancer often added to restaurant foods, canned vegetables, soups, and deli meats. MSG's hard-to-duplicate sweet, salty taste is also a mainstay of many Asian foods. Though some people react to MSG, the Mayo Clinic and the Food and Drug Administration consider it generally safe.

Soup stock

INGREDIENTS

4 lbs. venison bones containing some meat
4 T. olive oil
Kosher salt
2 T. fresh rosemary, chopped (or 2 t. dried)
1 T. crushed black peppercorns
1 T. dried thyme
4 bay leaves
1 medium onion, chopped
2 large carrots, chopped
4 celery stalks, chopped
⅓ c. fresh parsley, chopped
Table salt to taste

DIRECTIONS

Preheat oven to 400 F. degrees.

With a hacksaw, cut bones into large pieces that will fit into a stock pot. Coat bones with olive oil and a liberal dose of kosher salt. Place bones on a rack in a roasting pan and roast until golden brown (about 3 hours).

Put the bones in a large stockpot, cover with cold water, and bring to a simmer. Periodically skim the foam that forms on the surface and simmer gently for at least 4 hours. Add the remaining ingredients and simmer for another 2 hours.

Remove bones and strain stock through a colander into another pot. Discard vegetables and herbs. Ladle the venison stock through a jelly strainer bag or cheesecloth to strain again. Add salt to taste to the clarified stock and pour into quart jars.

Let the stock cool overnight in the refrigerator. When it cools, a hard fat layer will form at the top. Remove with a spoon and discard.

Use the stock at once as the base for a soup or in place of water in other recipes to add a scrumptious, savory note—or freeze it. It keeps frozen for a year.

Note that this broth is not specifically seasoned for the Vietnamese dishes pho or Bún bò Huế, but it makes a great basic noodle soup. ■

Making the tough call

In late November of last year, FWP game wardens were forced to euthanize a moose that had spent the previous weeks limping around midtown Billings. The young bull appeared sick, struggled to walk, and was obviously in extreme pain. Our wildlife health experts determined that it likely wouldn't survive being tranquilized and relocated to the wild. A necropsy later determined that the bones in both front feet had degenerated, probably because of a severe infection. "That's not something that would ever heal and would only have gotten worse, causing even more pain," FWP veterinarian Dr. Jennifer Ramsey told me.

As is often the case when the department has to kill a moose, bear, mountain lion, aggressive buck, or other big game animal, we took some flak. Some people thought we should have left the moose alone and let nature take its course. Others wanted us to return the young bull to the wild or send it to a zoo. Some hunters even said they should have been allowed to hunt the moose—in downtown Billings.

Deciding what to do when large wild animals enter populated areas, especially those that are sick or pose a risk to human safety, is one of the hardest things we do in this department. We spend so much time and effort keeping wildlife populations healthy and strong that it's heartbreaking to have to euthanize an animal. But it's our responsibility to make those decisions.

When we receive a report of a big game animal in an area where it shouldn't be, we foremost must determine if it poses an *immediate* threat to human safety, like a grizzly that has broken into an occupied cabin; a *potential* threat, like a young male mountain lion moving through a subdivision; or only a *marginal* threat, like a wolf cruising past a distant farmhouse at night.

If the animal isn't an immediate threat, we often do nothing other than monitor its movements. For example, moose and black bears that might prove difficult to capture or even find after an initial report usually leave or disappear from developed areas on their own, resolving the situation themselves.

But if they don't, and there seems to be a potential threat, we have to determine if it's possible to remove or capture the animal and relocate it in the wild. That's far easier said than done. Even if a game warden makes a perfect shot with a tranquilizer rifle, the drug could cause a heart attack or cause the animal to stumble and break a leg. Once the animal is down, our people then have to carefully calculate their approach. How do you know when it's safe to walk up to a sedated grizzly and load it into a trailer for transport? Our wardens and bear specialists have to decide that all the time.

Then there's figuring out where to relocate an animal. We don't want to put it where it will just create more problems. Nowadays people live in almost all the accessible mountains and foothills that wildlife call home. And the undeveloped areas? Grizzlies and wolves, especially, leave those places because the habitat is full and others of their species push them out. There just aren't many vacancies anymore.

As for zoos, we occasionally send an animal to an accredited facility where we are certain that conditions are humane. But most zoos are full and only rarely have room for another bear, moose, or cougar.

Yet another issue is disease, especially chronic wasting disease. Because we're concerned about spreading this deadly wild cervid disease, we don't relocate any dangerous, nuisance, or orphaned deer or elk. And any wild animal brings its parasites, viruses, and bacteria with it, increasing the risk of introducing diseases to other wildlife populations, livestock, and even people.

As for allowing hunters into a residential or business area to shoot a limping moose or a bear feeding from a dumpster? I'm sorry, but no. Not only would that break local laws prohibiting hunting or discharging a firearm within city limits, it would also pose far too great a risk to public safety—not to mention going way beyond the limits of ethical fair chase hunting.

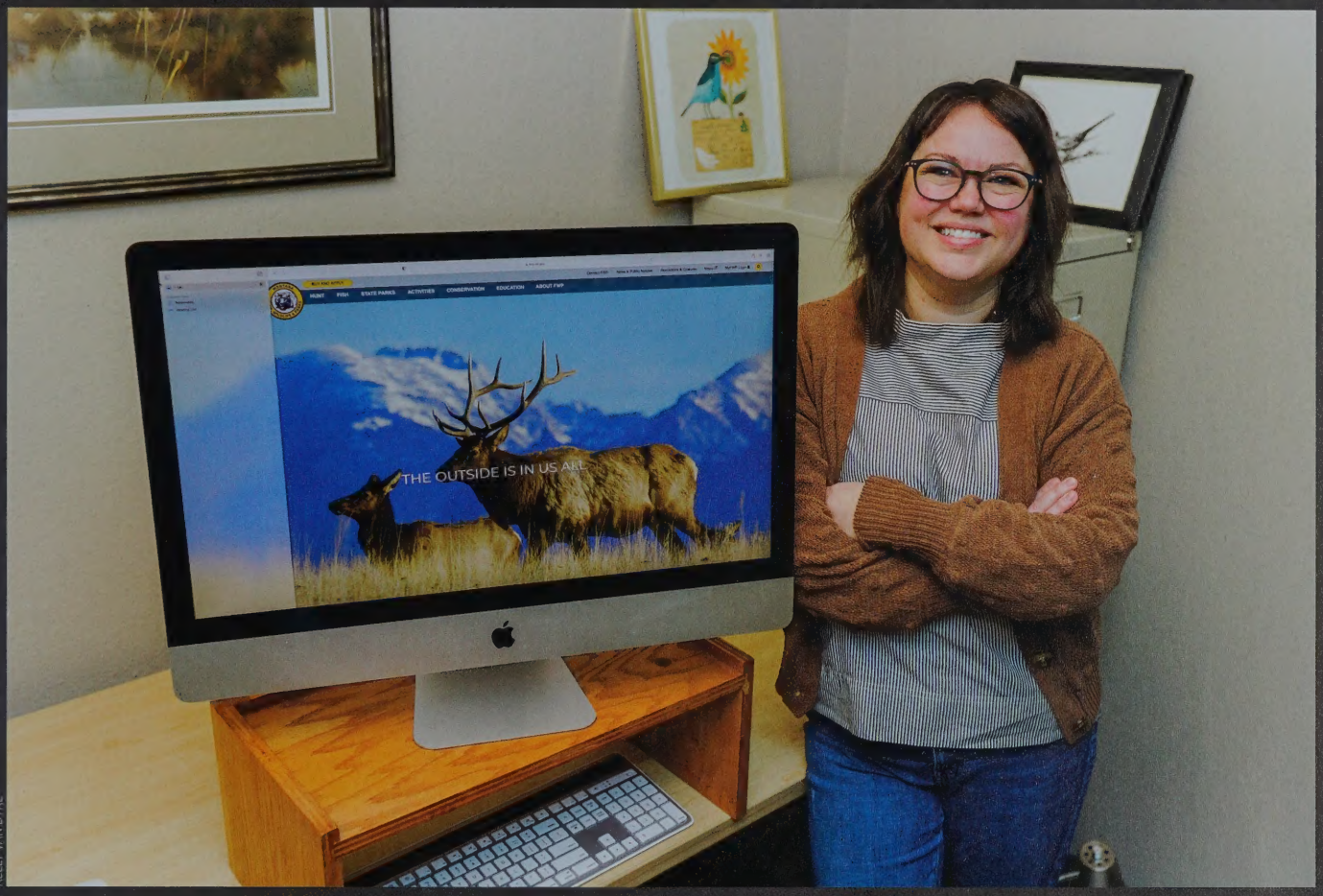
FWP employees care deeply about Montana's wildlife. That's why they entered the wildlife conservation field in the first place. But sometimes they have to make the tough call that results in an animal's death. I don't envy the game wardens, biologists, or veterinarians who have to put down a moose—or any other wild animal. But I know they do it only when there's no other safe, healthy, or feasible alternative.

—**Hank Worsech**, Director, Montana Fish, Wildlife & Parks

Setting a bear trap along the Front to catch a grizzly spending too much time near a town and ranches.

Dealing with wild animals that are sick or pose a risk to human safety is one of the hardest things we do in this department.

CHRISTINE PAIGE/MONTANA FWP



KELLY VAN DYKE

WEBMASTER

MISSY ERVING
FWP Web Content Manager, Helena Headquarters

I GREW UP HERE IN HELENA, and earned my BA in history at the University of Montana. After realizing that there's not a lot you can do with that degree, I took a job with the Montana Department of Transportation, where I worked in various positions for a few years. Colleagues would always ask me to help them figure out different computer programs, and I realized that I was pretty good at that. I decided to go back to school, this time at Carroll College, to take courses on web design. I've always enjoyed being creative and solving problems, so web design was a perfect fit for me, combining graphic design with the technical work of coding.

From there I got a foot in the door with FWP through an internship. Right away I could see that people work here because they're passionate about what they do, and I wanted to be a part of that environment. I eventually worked my way up to web content manager, a position I've held since 2015.

My main job is to manage requests from our employees to update FWP website pages or create new ones (fwp.mt.gov). For instance, this morning I posted the department's new grizzly management plan so it's available for public review and comment.

It's a big responsibility to manage the department's website, because it showcases almost everything FWP does and makes the entire agency accessible to the public—not to mention being a place where people can buy their hunting and fishing licenses online. (By the way, I don't manage the online licensing component, GIS maps, or the Hunt Planner. But I work closely with my FWP colleagues who do, to make those features available to the public on the department's website.)

The best things about this job are all the wonderful and talented people I work with; learning new things about fish, wildlife, and outdoor recreation management each day; and the satisfaction of knowing that what I do is important and appreciated.

Editor's note: In 2022, FWP took first place in the website category at the national Association for Conservation Information awards competition.

Ed Coyle, a property manager and photographer who lives near Jeffers, was driving through the Madison Valley one morning in mid-March searching for mountain bluebirds. "That's about when we get our first sightings around here, and I was thrilled to see this one," he says. Coyle spotted the male on a fencepost, pulled over, and took this shot with the Tobacco Root Mountains in the background, the bird's electric blue plumage contrasting with the dull tans and browns of the grasses and wooden posts. "Mountain bluebirds are often the first burst of exciting color in our valley after a long, drab winter," Coyle says. "This is the image I had hoped to see when I set out that morning." ■

4,000 Miles of groomed snowmobile trails in Montana.

Waterfowl up, other birds down

The latest report on U.S. bird populations offers a tale of two trends, one hopeful, one dire. Published by 33 leading science and conservation organizations and agencies, the "2022 U.S. State of the Birds Report" is the first comprehensive look at the nation's birds since a landmark 2019 study showed the loss of nearly 3 billion birds in the United States and Canada in 50 years. Key findings from the new report:

- Waterbirds and ducks in the U.S. have increased by 18 percent and 34 percent, respectively, since 1970.
- U.S. grassland birds are among the fastest declining, with a 34 percent loss during the same period.
- Over half of U.S. bird species are declining.

The report advises that meeting declining birds' needs will require a strategic combination of partnerships, incentives, science-based solutions, and public will to dramatically scale up the conservation of fast-disappearing bird habitats such as native grasslands. ■

Peak migration is usually the last week of March. But check the Freezout web page before you go.

WILDLIFE WATCHING

FWP web page updates Freezout waterfowl count

Each year in late winter, photographers and bird watchers thrill to the sight of snow goose "tornadoes" rising up from Freezout Lake, about 20 miles northwest of Great Falls. But the spectacle is witnessed only by those who show up on the right days.

Tens of thousands of migrating ducks, geese, tundra swans, and other birds pass through this area on their way to northern nesting grounds. The lake and surrounding barley fields provide an essential pitstop for resting and refueling during the long journey.

Because the birds stay only a few weeks, visitors need to know what stage the migration is in before making the drive to Freezout Lake Wildlife Management Area (WMA). On average, the last week of March sees the largest number of migrating waterfowl, but that can change due to storms and other weather.

FWP has a new web page that includes daily Freezout Lake updates during spring and fall migrations. The page also includes information on the WMA's history and management, as well as hunting, wildlife watching, and trapping opportunities and a detailed map.

To view the page, visit fwp.mt.gov and click on the Conservation tab at the top. From the menu on the left, select "WMAs," then search for "Freezout Lake WMA." On the Freezout Lake WMA page, click on the "Freezout Lake WMA Story Map" link under the photo. ■

CLIMATE

State climatologist predicts even warmer days ahead

Dr. Kelsey Jencso, state climatologist with the Montana Climate Office, believes that by 2069, some areas of Montana can expect up to five more weeks of above-90-degree days each year.

During a Zoom conference on climate change this past November, Jencso explained his prediction by pointing out that, over the past 65 years, the state's temperature has increased 0.42 degree per decade while the national average is 0.26 per decade. That's an increase of 2.7 degrees in the past 65 years, which is also above the national average.

The greater rate of change is due to Montana's higher altitude, making it more sensitive to temperature fluctuations, Jencso told the conference, organized by the Montana League of Women Voters. He also said:

- Total precipitation from spring rains has increased by 1.3–2 inches per year in eastern Montana and declined by 0.9 inch in western Montana.
- By mid-century, computer models predict a 5-degree temperature increase in eastern and north-central Montana and a 4-degree increase in central and western Montana.
- Also by mid-century, eastern Montana is expected to have 39 more days above 90 degrees each year, and western Montana will see 10 to 15 additional days of 90-degree-plus temperatures. ■

CLOCKWISE FROM TOP LEFT: MIKE MORAN ILLUSTRATION; CHRIS MCGOWAN; SHUTTERSTOCK

WILDLIFE CONSERVATION

FWP Partnerships: Bighorn Sheep

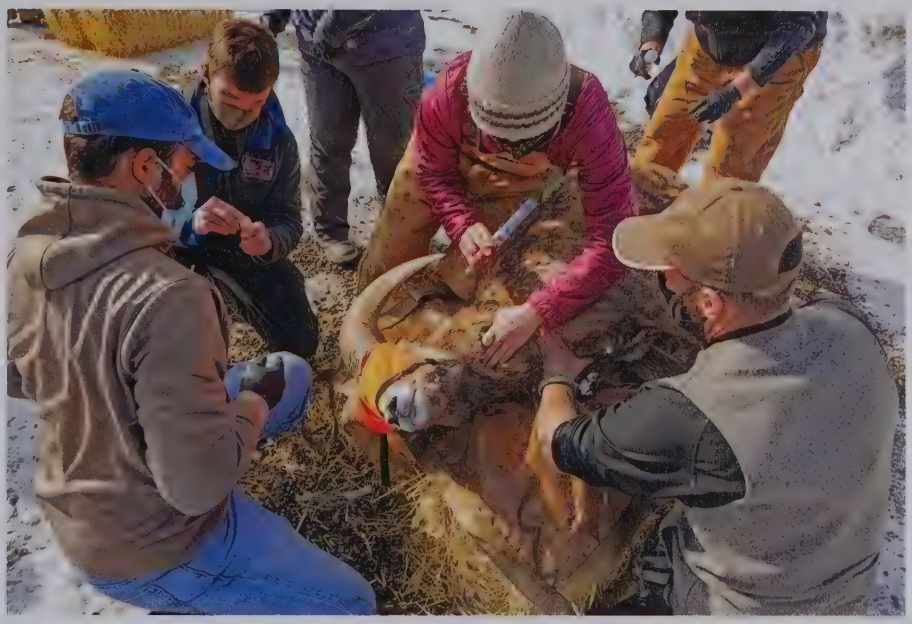
With their massive curled horns, heavily muscled bodies, and gravity-defying scrambles across steep cliffs, Rocky Mountain bighorn sheep are one of the West's most iconic wildlife species. Montana is home to several dozen herds comprising roughly 6,000 bighorn sheep, including some of the continent's biggest rams.

The foremost conservation groups helping Montana Fish, Wildlife & Parks with bighorn sheep conservation and management projects are the Wild Sheep Foundation (WSF) and Montana Wild Sheep Foundation (MWSF), an affiliate of the national group. Both based in Bozeman, the groups were founded in 1977 and 1992, respectively, in response to declining wild sheep numbers and shrinking range across the North American West. Working with hunters, state and federal conservation agencies, landowners, and others, they have raised funds and supported research that have helped increase wild sheep numbers continent-wide.

In Montana, the groups have been instrumental in key research and habitat projects aimed at stemming declines of imperiled herds. For instance, they are helping fund the department's Highland herd study, featured in the November-December 2022 issue of *Montana Outdoors* ("Whatdunit?"), and prescribed-burn and conifer-removal projects to restore grassland habitat.

FWP officials say the Montana Wild Sheep Foundation has been especially vital in establishing a working relationship with the Montana Wool Growers Association to help limit the spread of pneumonia and other diseases by reducing interactions between wild and domestic sheep. "It's the only partnership between the sheep industry and wild sheep conservationists that we know of in the entire country," says Brian Wakeling, chief of the FWP Game Management Bureau.

Though Montana's overall bighorn population is growing, several herds have been decimated by pneumonia over the past several decades. The disease can also kill domestic sheep. The Montana Wild Sheep Foundation is working with wool growers to reduce contact between the two species.



MORGAN JACOBSON/FWP

Volunteers with wild sheep conservation groups and other organizations help FWP biologists take blood samples from a bighorn sheep headed for the Little Belt Mountains.

Among tools being considered for study are guard dogs trained to keep bighorns away from domestic herds, increased use of mobile electric fencing, and GPS radio collars for tracking wild and domestic sheep movements. "We strongly value the relationships we've built over the years with our conservation and agricultural neighbors," MWSF president DJ Berg says. "The cooperative agreement between the Montana Wild Sheep Foundation, the Montana Wool Growers Association, and FWP continues to be the cornerstone of wild sheep restoration progress in Montana."

Wakeling says both groups also help department biologists access private land for research. "For instance, we can't test for pneumonia in wild sheep on private property without permission from the landowners," he says. "Our partners have been essential to helping us open those doors."

The national Wild Sheep Foundation manages the auction of a single statewide FWP bighorn sheep permit that allows the winning bidder to hunt in any Montana hunting district. Held since 1986, the auction has generated more than $8 million for FWP bighorn sheep programs. "We're honored with the trust that FWP places in the Wild Sheep Foundation to sell this tag for the state," says Gray N. Thorton, the group's president and chief executive officer, who notes that the 2023 tag recently sold for $320,000. "We support FWP 100 percent and hope the new proceeds go to support more cooperative projects in the future."

The wild sheep conservation groups also helped fund FWP's translocation of bighorns from the Missouri River Breaks to historic bighorn habitat in the Little Belt Mountains southeast of Great Falls (*Montana Outdoors* "Bringing Bighorns Back," September-October 2021). And they assisted in designing studies that measure the effectiveness of reducing numbers of mountain lions and other predators in key bighorn areas.

FWP director Hank Worsech says the partnerships "are definitely having a major positive effect on bighorn sheep management in Montana. Strong relationships like these increase FWP's reach and allow us to accomplish far more than we could alone. They also bring in the perspective of people outside our department, which we always value." ■

SOCIAL MEDIA

Playful FWP Fisheries social media crew racks up followers and awards

One video explains the cuss words you might hear while ice fishing. A poster introduces a new word to the English language—"fishstancing"—to define social distancing during the Covid 19 pandemic in terms of fish length, as in: "Stay two shovelnose sturgeon away from each other." A Chopping Dance meme explains an invasive-clam removal project on Lake Elmo. And a viral video depicts a biologist singing his own version of Tai Verdes's song "AOK" while being "KOK" counting kokanee salmon redds.

These creations and more of the Montana Fish, Wildlife & Parks Fisheries Division are part of the weekly #FisheriesFriday feature on Facebook, Instagram, and Twitter. The award-winning social media postings began in early 2019, and not a single Friday has gone fishless since, adding up to roughly 300 posts.

"We fish people are inherently weird and creative," says Zach Shattuck, an FWP fisheries biologist. "We're always looking for new and creative ways of looking at fish."

#Fisheries Friday is only one part of FWP's social media presence. The agency shares information with 60,000 followers on Facebook, 62,400 followers on Instagram, and 22,800 followers on Twitter. "#FisheriesFridays are definitely some of our most popular posts on social media," says Missy Erving, FWP web content manager.

The #FisheriesFriday crew started the campaign to build stronger connections with the public. "Science is facing a big challenge across the globe," says David Schmetterling, a #FisheriesFriday founder. "These days, anyone with an opinion is given the same credibility as scientists and others who have factual knowledge and years of experience."

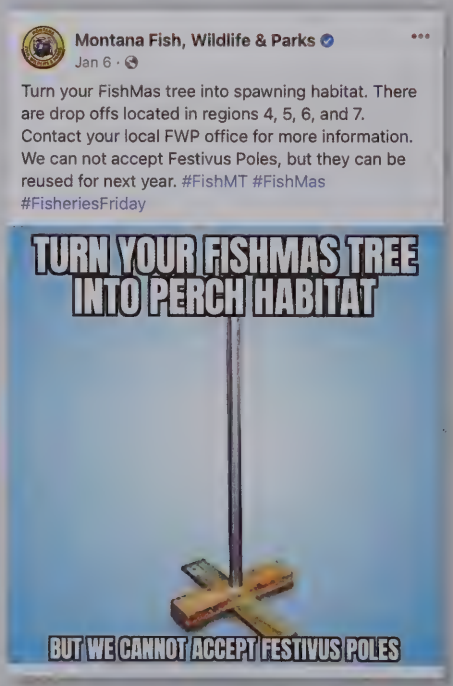
Schmetterling says one #FisheriesFriday goal was to show the human side of FWP. "We wanted people to see who we are. If people know and trust you, they're more likely to accept the scientific information you provide" he says.

The features have evolved over time. Early posts were long and heavy on science. But somewhere along the way, the crew hit the perfect balance of humor and education. Their "The crAy Team" series, a parody of the 1980s television series *The A-Team* featuring an underground team of fisheries biologists, won first place for social media campaigns in the 2022 national Association for Conservation Information awards competition. Their post for the Lake Elmo invasive clam removal project took second place.

"It's a challenge," says fisheries biologist Adam Strainer. "Fun has always been at the basis of all our posts. We want to be cheesy and goofy but also educational. Plus, we had to learn to say what we needed to say in a video that's three minutes or shorter."

Currently, the #FisheriesFriday creators are Schmetterling, Strainer, Shattuck, Ewing, fisheries biologists Bryan Giordano and Shannon Blackburn, and regional Information and Education Program manager Chrissy Webb. The crew promises more fun, irreverent posts in the future. ■

To view future #FisheriesFriday posts, follow FWP on Facebook, Twitter, or Instagram.


Montana Fish, Wildlife & Parks
Jan 6 ·
Turn your FishMas tree into spawning habitat. There are drop offs located in regions 4, 5, 6, and 7. Contact your local FWP office for more information. We can not accept Festivus Poles, but they can be reused for next year. #FishMT #FishMas #FisheriesFriday
TURN YOUR FISHMAS TREE INTO PERCH HABITAT
BUT WE CANNOT ACCEPT FESTIVUS POLES

Montana Fish, Wildlife & Parks
Feb 4, 2022 ·
Tag your Valentine below, and please print and share these Fish of Montana Valentine's Day cards with someone who's a reel catch. DOWNLOAD... See more
cause you are a heartbreaker!
You're the apple of my sock-eye
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No trout about it you're a reel catch!
Whole Lota love for YOU!
Let minnow If you'll be my valentine
555
135 comments 432 shares
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Montana Fish, Wildlife & Parks
Sep 17, 2021 ·
crAy Team Ep 4- Answers. Over the next couple of weeks we will answer your questions. This weeks question comes from @bennyob301 what... See more
58
15 comments 30 shares 2.9k views

Montana Fish, Wildlife & Parks
May 28, 2021 ·
Licensed Anglers: keep as many fish as you want- all creel and fish-length limits have been removed from Lake Elmo near Billings.
The lake will be completely drained in October 2021 and will remain empty until April 2022 to rid the lake of invasive Asian clams. Unfortunately, because fish can pass live clams that they may have eaten, fish from Lake Elmo cannot be moved to other water bodies. Any fish remaining in the lake when it is drained will have to perish in place along with the invasive clams.
The heat this summer is at Lake Elmo's Fire.
LAKE ELMO'S FIRE
The passion burns deep.
Montana Fish, Wildlife & Parks
Apr 26, 2019 ·
Another #FisheriesFriday already?!? We're taking a break from the usual #FishFacts today (since you are all sturgeon experts by now) and introduc... See more
123
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CONSERVATION

New Montana Outdoor Hall-of-Famers

This past winter, the Montana Outdoor Hall of Fame announced its 2022 inductees at a ceremony in Helena.

The Hall of Fame was created in 2013 to honor individuals, both living and deceased, who made significant and lasting contributions to the restoration and conservation of Montana's wildlife and wild places. The awards recognize Montana's historical and contemporary conservation leaders while capturing the stories of these individuals as a way to raise public awareness of conservation in Montana.

"It is important to recognize the contributions of people who continue to make Montana such a special place," Patrick Graham, former FWP director and retired executive director of The Nature Conservancy in Arizona, said at the banquet honoring the inductees. "None of it gets done by one person. It is a network of people often working over many years."

To read more about the 14 inductees listed here and other conservation heroes honored in 2014, 2016, 2018, and 2020, visit mtoutdoorhalloffame.org.

1. Stan Bradshaw, Helena. *Stream and river public access protection.*
2. Bruce Bugbee, Missoula. *Public land protection.*
3. Harrison G. Fagg, Billings. *Hard rock mining and other environmental standards.*
4. John G. Gatchell, Helena. *Wilderness protection.*
5. Kathleen Hadley, Deer Lodge. *River protection, fish and wildlife conservation.*
6. Land M. Lindbergh, Greenough. *Private land conservation and public access.*
7. Robert "Bob" Marshall (1901-1939). *Wilderness protection.*
8. John R. Murray, Browning. *Badger-Two Medicine designation as a Traditional Cultural District.*
9. Christine Torgrimson (British Columbia) and 10. Barbara Rusmore (Bozeman). *Private ag land and public river protection.*
11. Bradley B. Shepard (1952-2021). *Cutthroat trout conservation.*
12, 13, and 14. The Three Yayas: Annie Pierre (1900-1975), Louise McDonald (1904-1994), and Christine Woodcock (1910-1986). *Mission Mountains Tribal Wilderness protection.*

FWP VIDEO SHOWCASE

Recent videos produced by FWP staff for social media and television

Spring nest box cleanup
Corie Bowditch (Rice) and a team of volunteers explain why cleaning nesting boxes of feathers and nesting material each spring helps cavity nesters such as bluebirds and swallows.

Cold-blooded in cold weather
Reptile and amphibian expert Matt Bell explains why we don't see snakes, toads, turtles, and other cold-blooded species in winter and how they survive the cold weather.

Catchy habitat song
Corie Bowditch and Matt Ferrell sing "Habitat," written by Bill Oliver and popularized by Walkin' Jim Stoltz. Great singalong for kids and adults. Warning: It's an earworm.

LOOKALIKES

Tips for differentiating similar-looking species

Grizzly bears and cinnamon-phase (brown-colored) black bears can be hard to tell apart. Size is not always an indicator, because some grizzlies are smaller than black bears, and both species can be brown. Look for a combination of characteristics. ■

PHOTOS: SHUTTERSTOCK

American black bear • *Ursus americanus*

Grizzly bear • *Ursus arctos horribilis*

Dalmatian toadflax *Linaria dalmatica*

What it is

Introduced into the western United States as an ornamental in 1874, Dalmatian toadflax is a noxious weed originally from the Mediterranean region of Europe (including the Dalmatian Coast of the Adriatic Sea) that has since spread throughout the West.

How to spot it

If it's not in bloom, you can identify the 2- to 3-foot-high plant by its small, rubbery, blue-green leaves that clasp the stem and have a waxy coating. In summer, look for the showy bright yellow flowers that resemble those on snapdragons.

Where it's found

The plant has spread throughout western, southern, and central Montana, especially in semiarid climates and coarse, dry soils. It thrives in disturbed areas like housing and road construction sites, overgrazed rangeland, and cleared lots and fields.

Illustration by Liz Bradford

How it spreads

This invasive plant spreads via abundant seeds (up to half a million) and aggressive lateral roots. The seeds, which can remain viable in the soil for up to 10 years, are moved around by wildlife, dogs, hikers, mountain bikers, and mechanized mowers.

Why we hate it

Like most noxious weeds, Dalmatian toadflax crowds out native vegetation and is far less edible and useful as nesting and hiding habitat for native birds and other wildlife. Cattle generally will not eat the plant, resulting in reduced livestock production.

How to control it

Hand pulling or digging can work on small infestations. But in larger patches, neither method works because any root fragments resprout. Clipping, bagging, and disposing of flowers will reduce seed spread. Chemical control can work, but only by experts. Some beetles, weevils, and other biocontrols have shown promise in controlling infestations.

Learn more at mtweed.org.

"Connectivity"

A quick look at a concept or term commonly used in fisheries, wildlife, or state parks management.

All fish and wildlife species need to move from one place to another during the year to find the best places to feed, raise their young, and survive winter. Movements that cover long distances between summer and winter habitats, known as "migrations," can be epic. For instance, FWP fisheries biologists recorded sauger swimming more than 150 miles from Fort Peck Reservoir upstream to spawning areas near the Fred Robinson Bridge. Movements within a season can be relatively short, like a Columbia spotted frog that may hop only a few hundred feet from a stream edge to a forest opening and back during the summer.

The degree to which a landscape allows for movements and migrations is called "connectivity." Many constructed objects, like barbed-wire fences on pronghorn range and diversion dams in trout tributary streams, reduce connectivity. As a result, fish and wildlife can't reach the spawning, nesting, rearing, wintering, and other seasonal habitats they have adapted to use, lessening survival. Barriers or habitat fragmentation can also isolate populations, like the freeways that block grizzly bear movement, leading to inbreeding and the loss of genetic variability.

FWP works with private landowners and other land management agencies to identify barriers that impede critical fish or wildlife movement and find ways to remove the obstacles or modify them so animals can continue on their journeys. ■

Hydropower dams and irrigation diversion structures like Gibson Dam on the upper Sun River (above) reduce connectivity by blocking upstream and downstream fish migration.

What's That Animal Called?

The oft-confusing common names, nicknames, and misnomers of fish and wildlife—and how a Swedish naturalist in the mid-1700s tried to clear things up. **BY TOM DICKSON**

Imagine four friends fishing the Milk River near Havre one summer afternoon. After splitting up for a few hours, they rejoin and swap stories. One angler says she caught and released a "gray bass"; another landed a "croaker"; the third caught a "grunter"; while the fourth hooked a nice "sheepshead."

If you didn't know these nicknames, you'd have no idea that all four refer to the same fish: freshwater drum.

Ever since humans developed language, we have been inventing names for animals, plants, and other species—and then puzzling over the names. This process of devising or assigning labels, known as nomenclature, is essential for scientists studying living organisms. For the rest of us, knowing the names of animals allows us to talk about them with each other. It also creates intimacy with those creatures so we can better understand and appreciate them. Robin Wall Kimmerer, noted author and director of the Center for Native Peoples and the Environment at the State University of New York, considers naming a way to know the true essence of an organism. "Finding the words is another step in learning to see," she writes.

Each species has several different names—ranging from localized slang to Latinized taxonomy (which we'll get to in a minute). Though the multiple monikers can be fun, illuminating, and descriptive—think "speed goat" for pronghorn or "spoonbill" for paddlefish—they can also create confusion. Your "polecat" might be my "stink weasel," without either of us knowing we're both talking about the striped skunk. Further complicating matters are scientists who continue to change animal names and reclassify species based on new DNA science.

A Northern European naturalist devised a nearly foolproof scientific naming solution nearly four centuries ago. Yet confusion still remains—a result of local pride, cultural tradition, human movement between regions and continents, and even disagreements among the very experts whose job it is to clarify animal names.

> Many animal nicknames we use now were coined by Europeans who, upon visiting the American West, saw unfamiliar animals and named them for similar species back home.

UH-KA-SHE and *TAHTO'KANAH*

North Americans have been naming fish and wildlife ever since humans arrived here from Asia thousands of years ago. Over time, each group developed its own word in its own language to identify, for instance, the large mammals we today call moose, the fish-eating raptors known as ospreys, and the barking communal rodents commonly called prairie dogs.

In *Prairie Ghost: Pronghorn and Human Interaction in Early America*, authors Richard E. McCabe, Bart W. O'Gara, and Henry M. Reeves documented more than 220 different names given to the pronghorn by roughly 100 tribes across the West—including, in today's Montana, *uh-ka-she* (Apsáalooke), *tahto'kanah* (Assiniboine), and *choo ool le* (Salish).

When Europeans arrived, even more names were invented, as zoologists and government officials began "discovering" species and applying new scientific labels. Meanwhile explorers, hunters, and others affixed their own nicknames—sometimes several for the same creature. Lewis and Clark, for instance, used 10 different names for the sage-grouse they observed during their 1805-06

FRESHWATER DRUM
Aplodinotus grunniens

journey, including "long-tailed heath cock" and "prairie fowl."

TAXING TAXONOMY

In addition to the unique scientific name for each species is its "common name." These are determined by taxonomists—biologists who specialize in naming and classifying species with organizations like the American Fisheries Society and the Society for the Study of Amphibians and Reptiles. Taxonomists base their decisions on factors like historical usage, contemporary usage, and new scientific information.

Many common names are derived from an animal's highly visible features, like the westslope cutthroat trout's vivid orange neck slashes or the red-winged blackbird's bright crimson wing patches. Others are named for their places of official "discovery," such as the Idaho giant salamander. Some names honor people who originally identified or helped collect the species for science, like the Richardson's ground squirrel (named for Sir John Richardson, a Canadian physician who collected specimens in Saskatchewan in the 1820s).

Though taxonomy aims to reduce confusion and misidentification, some official labels create more problems than they solve. For instance, little brown bat sounds like a description, like "little brown bird," but is actually the common name of the bat species *Myotis lucifugus*. Another puzzler is the common nighthawk, which looks hawk-like as it swoops overhead at dusk eating winged insects but isn't a hawk at all. It's actually related to whip-poor-wills.

One of the most vexing name-related challenges for Montana Fish, Wildlife & Parks staff is when someone calls to report a "brown bear." Most likely they are seeing a black bear, the species *Ursus americanus*, which can be a black, brown, or cinnamon "phase." Yet the caller could mean a grizzly bear, a protected species that FWP must manage under strict federal provisions. That's because the grizzly, found in the Alaskan and western interior, including Montana, is the same species (*Urus arctos horribilus*) as the brown bear species, which lives along the Alaskan coast. In other words, there can be a big difference between "a" brown bear and "the" brown bear.

DIGITAL COMPOSITIONS WITH PUBLIC DOMAIN IMAGES BY LUKE DURAN. FRESHWATER DRUM ILLUSTRATION BY WILLIAM B. GILLETTE, 1907.

Then there's the taxonomists themselves, who occasionally decide to change common names. For decades, what are now officially rock pigeons, the cooing residents of town squares and grain terminals, were officially named rock doves. The American Ornithological Society also changed the name Canada jay—twice, first to gray jay in 1957, then back to Canada jay in 2008. In 2006, geneticists discovered that the blue grouse was actually two species: the sooty grouse of the Pacific Coast and the dusky grouse of the Rocky Mountains (including Montana). Alas, the blue grouse is no more.

Though rarely, names may also change to reflect new social conventions. In 1998 the American Fisheries Society changed northern squawfish to northern pikeminnow in deference to Native people and others who find the term "squaw" offensive. ("Squawfish" may have come from "squawk fish," perhaps coined for the sound the fish made when held. Somewhere the "k" may have been omitted.) In 2020, the American Ornithological Society replaced the McGown's longspur, previously named after Confederate general John Porter McGown, with the name thick-billed longspur.

The easiest way to verify official common names here in the Treasure State is to check the Montana Natural Heritage Program's Montana Field Guide website (fieldguide.mt.gov).

LIKE BACK HOME

Many of us don't use official names. Instead we go with nicknames, often coined years ago by people who, upon visiting the American West, saw unfamiliar animals and named them for similar species back home. "Buffaloes" looked enough like African Cape buffaloes or Asian water buffaloes, which early visitors to the West had presumably seen in picture books, that the name seemed appropriate for the shaggy Great Plains denizens. More than a century after scientists came up with the name American bison to describe the species *Bison bison*, people still refer to the animal by its original moniker.

Some nicknames are shortened forms, like "grizzly," "whitetail," "smallmouth," and "rainbow." Others act as descriptors, like channel catfish, called "talkers" or "squeakers" for the noise they make when held. Yellow-rumped warblers are nicknamed "butter butts," and ospreys are called "fish eagles."

Nicknames can also refer to a species' origins. The names "Mackinaws" or "Macs" for Flathead Lake lake trout originated as a reference to an island in Lake Michigan where the large char are native. Some older anglers still talk of brown trout as "German browns" or "Loch Levens" for the German or Scottish origins of the fish first stocked in Montana more than a century ago. (In fact, the FWP fisheries staff code for brown trout is still "LL.")

The nicknames "croaker" and "grunter" for freshwater drum come from a sound, sometimes audible to anglers above water, made when the fish rubs a ligament against its swim bladder. Anyone who has heard a Canada goose knows why they are dubbed

DIGITAL COMPOSITIONS WITH PUBLIC DOMAIN IMAGES BY LUKE DURAN.
GRIZZLY BEAR ILLUSTRATION BY WINFRED AUSTEN, 1900. ROCK PIGEON ILLUSTRATION BY JOHN GOULD, 1862.

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COMMON NAMES AND NICKNAMES

Submissions from more than 100 FWP employees who responded to a request for examples of animal nicknames used across Montana.

Official common name: **"nickname"** *(likely reason).*

FISH

Brook trout: **"speckled trout" or "speck"** *(spotted sides).*

Brown trout: **"German brown"** *(some of the first fish imported to North America came from Germany);* **"Loch Leven"** *(others came from this lake in Scotland).*

Bull trout: **"salmon trout"** *(size of large adults).*

Burbot: **"cusk"** *(variation of "torsk," a saltwater cod related to burbot);* **"poor man's lobster"** *(taste and texture of burbot meat);* **"ling"** *(shortened form of "ling cod");* **"eel-pout"** *(resemblance to the American eel; "pout" reference unknown);* **"lawyer"** *(skin texture).*

Channel catfish: **"talker" or "squeaker"** *(for noise made when held);* **"blue cat"** *(resemblance to blue catfish of southern states);* **"mud cat"** *(murky water habitat);* **"spotted cat"** *(small black spots on sides and tail).*

Cutthroat trout: **"cuttie"** *(shortened form).*

Freshwater drum: **"croaker" or "grunter"** *(sound audible to anglers made when fish rubs a ligament against its swim bladder);* **"sheepshead"** *(shape of fish's sloping forehead).*

Goldeye: **"goldeneye"** *(misnomer for goldeneye duck);* **"shiner"** *(coloration);* **"skipjack herring"** *(resemblance to a silvery, flat-sided fish of large Midwestern rivers).*

Kokanee salmon: **"blueback" or "silver salmon"** *(bright blue or silver coloration).*

Lake trout: **"laker"** *(casual form);* **"Mackinaw" or "Mac"** *(a large island in Lake Michigan where these char are prevalent).*

Mountain whitefish: **"snout trout"** *(elongated nose);* **"Rocky mountain bonefish"** *(slight resemblance to the salt-water species);* **"whistle pig"** *(pursed lips that appear to be whistling; the round, chunky shape of larger specimens).*

Northern pike: **"slough shark"** *(backwater habitats);* **"slimer"** *(slimy mucous body coating).*

Paddlefish: **"spoonbill" or "spoonbill catfish"** *(paddle-shaped rostrum and catfish-like skin).*

Rainbow trout: **"bow"** *(shortened form).*

Sauger: **"sand pike"** *(cream-gray coloration, sharp teeth, body shape, though not a member of pike family but rather of the perch family).*

Sculpins and stonecats: **"bullhead"** *(small size, body shape).*

Smallmouth buffalo, river carpsucker, other suckers with lips: **"carp"** *(misidentification due to lipped mouth).*

Walleye: **"eye"** *(shortened form);* **"walleyed pike" or "yellow pike"** *(sharp teeth and body shape, though not a member of the pike family but rather the perch family);* **"marble-eye"** *(opaque iris).*

BIRDS

American bittern: **"thunder-pumper"** *(bird's deep, resonant calls).*

American coot: **"mud duck"** *(wetland habitat).*

American dipper: **"water ouzel"** *(dippers spend much time walking underwater looking for insects; ouzels are European thrush species.)*

American kestrel: **"sparrow hawk"** *(preys on small birds).*

American wigeon: **"baldpate"** *(light-colored forehead).*

Black-necked stilt: **"tuxedo bird"** *(distinct black-and-white coloration).*

Canada goose: **"honker"** *(bird's honking call);* **"Canadian" goose** *(seemingly more appropriate adjective).*

Canada jay: **"gray jay"** *(gray color);* **"whiskey jack"** *(origin unknown);* **"camp robber"** *(thieving tendencies).*

Canvasback (drake): **"bull"** *(large size).*

Common or Barrow's goldeneye: **"whistler"** *(for sound of wings).*

Common nighthawk: **"skeeter hawk"** *(bird's consumption of mosquitoes).*

Franklin's grouse: **"spruce grouse"** *(conifer habitat);* **"fool hen"** *(naïve behavior).*

Gadwall: **"gray duck"** *(coloration).*

Goldfinch and yellow warbler: **"wild canary"** *(resemblance to pet canaries).*

Gray partridge: **"Hungarian partridge"** *(previous official common name based on the bird's eastern European heritage);* **"Huns"** *(short form).*

Gulls (14 different species in Montana): **"seagulls"** *(people unaware of species).*

Loggerhead shrike: **"butcher bird"** *(tendency to kill small birds and small mammals like voles, and impale them on sharp brush thorns or barbed wire).*

Mallard (drake): **"greenhead"** *(head color).*

Mourning dove: **"turtle dove"** *(familiarity only with name from books or songs).*

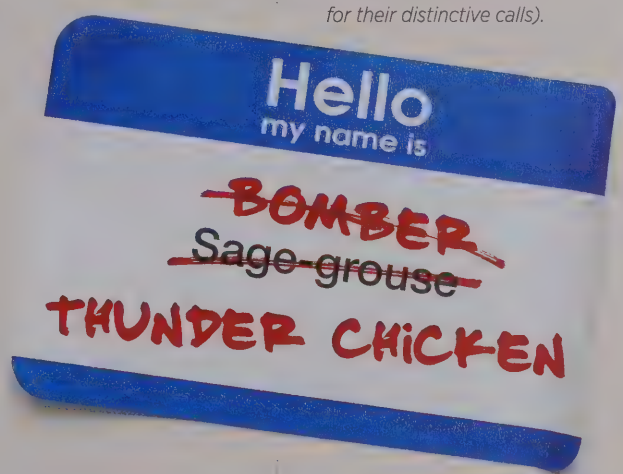
Northern harrier: **"marsh hawk"** *(wet meadow and shallow wetland habitats).*

Northern pintail: **"sprig"** *(long central tailfeather resembles a twig or shoot).*

Northern shoveler: **"spoonbill"** *(rounded oversized bill)*

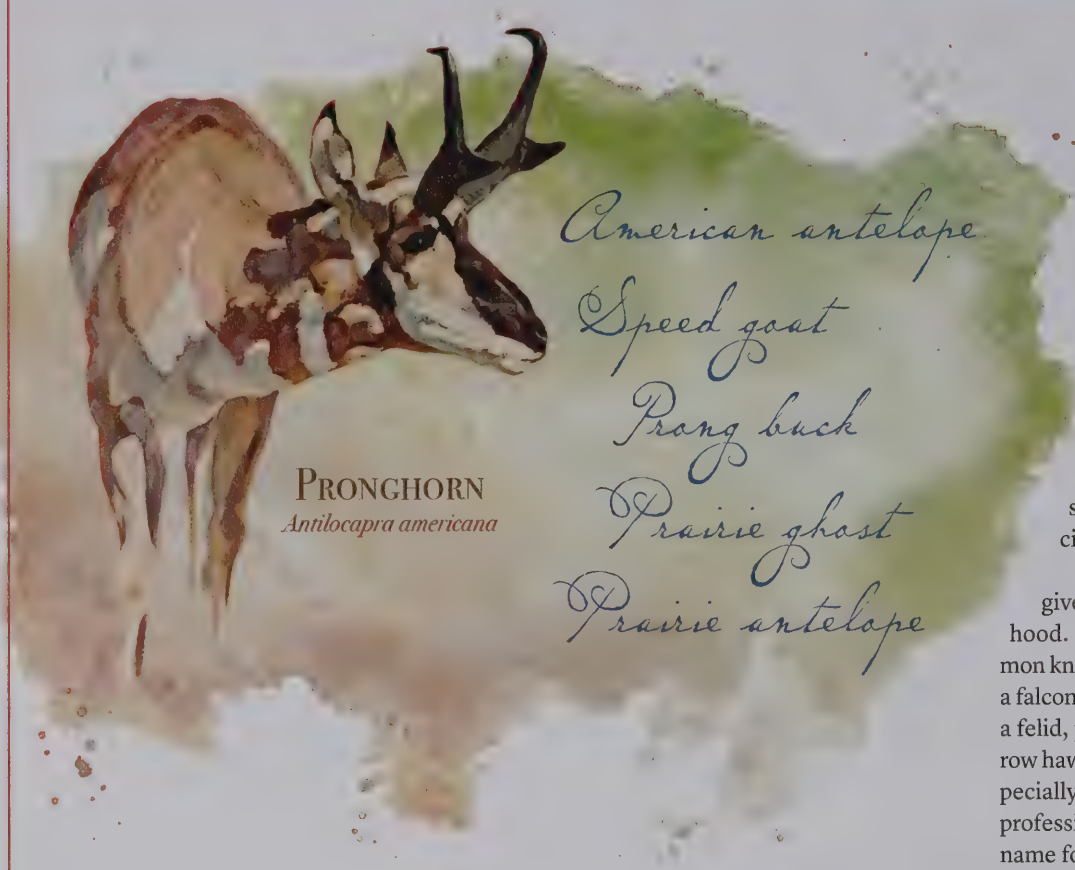
Osprey: **"fish eagle"** *(piscatorial diet)*

Owls: **"hoot owl"** *(name given to great horned and barred owls for their distinctive calls).*



Peregrine falcon: **"duck hawk"** *(tendency of river cliff-dwelling individuals to prey on waterfowl).*

Red-tailed hawk: **"chicken hawk"** *(tendency at one time to prey on domestic fowl next to homesteads).* ▶▶



PRONGHORN
Antilocapra americana

"honkers." Mosquito-eating nighthawks are sometimes called "skeeter hawks," and thieving Canada jays are rightly labeled "camp robbers."

Chris Phillips, manager of FWP's Yellowstone River Trout Hatchery, says his crew has come up with a tongue-in-cheek nickname for any large spawned-out hatchery trout: "flat tire."

FUN BUT TROUBLESOME

Many nicknames are playful, like "ditch parrot" for ring-necked pheasant roosters, or "baldpate" for the white-foreheaded American wigeon. The pika's moniker "haymaker" refers to the way the small alpine mammal harvests and stores grass for winter consumption. "I think it's just more fun for people to use the colorful names," says Ryan Schmaltz, an FWP educator in Helena.

Perhaps to make the reptiles less fearsome, some eastern Montanans call rattlesnakes "buzz worms." Anglers may refer to northern pike as "slough sharks" (for their shallow backwaters habitat and sharp teeth) or "slimers" (for the fish's slippery protective coating). Other nicknames seem more logical than the standardized versions. "Gardener" snake makes more sense than garter snake for reptiles often found in backyards, and the grammatical "Canadian" goose nickname rings truer to the ear than the awkward-but-official Canada goose.

A few nicknames border on slurs. Calling gray partridge "Huns" (for the nickname "Hungarian partridge") is considered an insult by some people of German descent.

Tom Dickson is the Montana Outdoors *editor.*

People occasionally use the cringeworthy "sky carp," "snot rockets," and "swamp donkeys" for Canada geese, northern pike, and moose, respectively—species held in high regard by many Montanans. Similarly, more than a dozen fish species are dismissed with the term "trash fish" by anglers unaware that carp, suckers, freshwater drum, and other nongame fish species can be fun to catch and delicious to eat.

Still, most people are reluctant to give up names they've used since childhood. For instance, even though it's common knowledge these days that the kestrel is a falcon and not a hawk, and the fisher is not a felid, people hold fast to the names "sparrow hawk" and "fisher cat." Resistance is especially staunch when wildlife agencies or professional organizations introduce a new name for an animal. "We need to be careful to not tell people that words they've used their whole lives for an animal are wrong," says Corie Bowditch, an education specialist at FWP's Montana WILD Education Center in Helena.

One animal that especially pits scientific nomenclature against nicknamers is *Antilocapra americana*—better known as pronghorn or antelope. Biologists say the world's only "true" antelope are members of the

CHANNEL CATFISH
Ictalurus punctatus

DIGITAL COMPOSITIONS WITH PUBLIC DOMAIN IMAGES BY LUKE DURAN

COMMON NAMES AND NICKNAMES *(continued)*

Ring-necked duck: **"ringbill"** *(prominent light ring around bill tip);* **"ringie"** *(shortened form).*

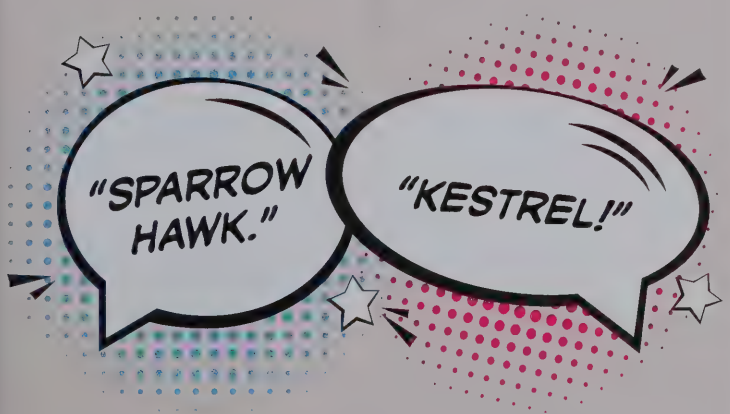
Ring-necked pheasant (rooster): **"ditch parrot"** *(colorful plumage and frequent appearance near roadsides);* **"ringneck"** *(shortened form).*

Ruffed grouse: **"ruffie"** *(shortened form).*

Sage-grouse: **"bomber"** *(large, slow-flying bird resembles a B-52);* **"thunder chicken"** *(booming sound made by males during mating season);* **"sage chicken" or "sage hen"** *(sagebrush habitat and slight resemblance to domestic fowl).*

Scaup (lesser and greater): **"bluebill"** *(bill color).*

Sharp-tailed grouse: **"prairie grouse" or "speckle-belly"** *(white spots on breast);* **white-breasted grouse** *(light breast feathers);* **"prairie hen" or "prairie chicken"** *(resemblance to species in states to the east).*



Sparrows and other small brown birds: **"LBJs"** *(little brown jobbers);* **"LBBs"** *(little brown birds);* **"tweety" or "dickey" birds** *(people unaware of various species. "Dickey" is 17th-century British slang for "small").*

Wood duck: **"woody"** *(shortened form).*

Yellow-rumped warbler: **"butter butt"** *(self-explanatory).*

MAMMALS

American marten: **"pine marten"** *(conifer habitat);* **"tree cat"** *(long claws resemble those on felids).*

Bats: **"flying mice"** *(resemblance to mice; old German word for bat,* fledermaus, *means "fluttering or flying mouse"; knowledge of the famous opera by Johann Strauss,* Die Fledermaus*).*

Bison: **"buffalo"** *(resemblance to African Cape or Asian water buffaloes).*

Bushy-tailed woodrat: **"packrat"** *(trait of "packing" or carrying around various items).*

Fisher: **"fisher cat"** *(catlike screams made at night).*

Grizzly bear: **"griz" or "grizzly"** *(shortened form).*

Moose: **"swamp donkey"** *(for alder and willow wetland habitats).*

Mountain goat: **"billy goat"** *(mistaken belief in a close relation to domestic goats).*

Mountain lion: **"lion," "puma," or "cougar"**

Mule deer: **"blacktail"** *(tail tip color);* **"muley"** *(shortened form).*

Pika: **"haymakers"** *(tendency to cut and store wild alpine grasses for winter consumption).*

Pocket gophers: **"moles"** *(people unaware of the species or that there are no moles in Montana).*

Porcupine: **"quill pig"** *(sharp quills and piglike appearance).*

Prairie dog: **"whistle pig"** *(whistling call).*

Pronghorn: **"speed goat"** *(rapid acceleration when alarmed);* **"antelope"** *(slight resemblance to African and Eurasian antelopes).*

Raccoon: **"trash panda"** *(garbage scavengers with black-and-white coloration);* **"wash bear"** *(tendency to wash food in streams.* Raccoon, *an Algonquin-derived term, translates as "hand-washer").*

Red squirrel: **"pine squirrel"** *(conifer habitat).*

Skunk (striped or spotted): **"stink weasel"** *(olfactory discharge);* **"polecat"** *(European name for a relative on that continent that sometimes preys on chickens, which are called* poule *in French).*

Swift fox: **"kit fox"** *(resemblance to relative species not found in Montana but in southwest U.S. and southern Great Plains).*

Various ground squirrels and prairie dogs: **"gophers"** *(people unaware).*

Vole: **"mouse"** *(mistaken identity to similar-looking species).*

Weasels (winter phase): **"ermine"** *(for the name given to the winter phase of the European stoat, a relative of North American weasels, though not an official name in North America).*

Yellow-bellied and hoary marmots: **"whistle pigs"** *(whistle call when alarmed);* **"rockchucks"** *(boulder habitats);* **"woodchucks"** *(closely related species not found in Montana but mostly in eastern states).*

OTHER

American larch: tamarack *(resemblance to the eastern U.S. tree species).*

Antlers/horns: **"horns"/ "antlers"** *(antlers, which are shed annually, are on only deer, elk, and moose, while horns are on only bighorn sheep, mountain goats, and pronghorn).*

Aquatic plants: **"moss"** *(by many farmers and ranchers)* and **"weeds"** *(many anglers).*

Army cutworm moth: **"miller"** *(perhaps because the powdery wings resemble dust that accumulated on people working in grinding mills).*

Butterfly chrysalis: **"cocoons"** *(unaware of the difference).*

Crayfish: **"crawdad"** or **"crawfish"** *(from other regions of the U.S., "craw" referring to "claw");* **"mudbug"** *(underwater substrate habitat).*

Garter snake: **"garden" or "gardener" snake** *(similar sounding and more logical meaning).*

Greater short-horned lizard: **"horned toad," "horny toad," or "horny lizard"** *(appeal of saying "horny," and not knowing that lizards aren't toads).*

Rattlesnake: **"buzz worm"** *(rattling tail).*

Toads: **"frogs"** *(people unaware of the difference).* ■

Readers: Surely we missed some. If you know of other animal nicknames that are used in Montana, send us a note at tdickson@mt.gov.

Bovidae family and live in Africa (like the gazelle) and Asia (like the saiga). The "antelope" of the American West, they explain, is the sole survivor of a family of speedy animals that raced across North America millions of years ago, and its closest relatives are the giraffe and okapi of Africa. To end the misperception, they insist on the name pronghorn. Yet the use of "antelope" persists—so much so that it's still in Montana statutes and emblazons FWP's "Deer, Elk, and Antelope" hunting regulations booklets.

While different common names and nicknames can be fun and colorful, they can create headaches for wildlife managers and game wardens. It's even trickier when scientists and wardens are communicating with each other from different regions of the United States, each with its own local common names and nicknames, and even more so among worldwide science organizations, where people are describing the same species in dozens or even hundreds of different languages.

Fortunately, about 375 years ago, someone invented a solution.

THE TWO-NAME SYSTEM

In the mid-18th century, the Swedish naturalist Carl Linnaeus came up with a naming system using two words, known as binomial nomenclature, for each species. The first word of each animal's "scientific" name is the genus (group of animals sharing certain characteristics), and the second is the species name, which differentiates it from other individuals in that group.

The genus name is always uppercase, the species name is always lowercase, and both are always italicized.

Think of the genus as someone's last or family name, and the species like their first name. (And yes, it's confusing that scientists talk of an animal "species" and also call part of its two-part scientific name "species.")

For instance, Montana's black-footed ferret, short-tailed weasel, and least weasel all belong to the genus *Mustela*. Their scientific binomials are, respectively, *Mustela nigripes*, *Mustela richardsonii*, and *Mustela nivalis*.

The genus name is usually a Latin or Greek descriptor, such as *Mustela*, Latin for "weasel." The species name often refers to a place where the animal was first described in English, or some characteristic of the animal. For instance, the turkey vulture's scientific name is *Cathartes*—a Latinized form of the Greek word *catharses*, meaning "purifier," referring to the scavenger's biological role of cleaning up dead things—and *aura*, a Latinization of the native Mexican word for the bird, *auroura*. "It's such a great system, in that scientists anywhere in the world can know what animal they are talking or writing about," says Bowditch.

Scientific naming is governed by the In-

NO WONDER YOU'RE PUZZLED

Official common names sometimes add more confusion than they clear up. For instance, the name for *Lepus townsendii* is white-tailed jackrabbit, but it is not a rabbit (born hairless and blind) but a hare (born with fur and open eyes).

Northern waterthrushes aren't in the thrush family but are instead closely related to the 38 warbler species that migrate through or nest in Montana. And meadowlarks are not larks at all but rather a type of blackbird.

Ringneck ducks have a barely perceptible neck ring and are usually called "ringbills" by waterfowl hunters for the bird's far-more-prominent bill ring. The red-bellied woodpecker lacks a red belly, sporting only the faintest pink blush that few people ever see.

Then there's the oddly named fisher—a cat-size, forest-dwelling member of the weasel family that doesn't hunt for or eat fish.

Lake trout and brook trout are both species of char, a salmonid related to but not the same as trout. What's more, many people refer to any trout that lives in a lake, like the rainbow trout that FWP stocks in mountain waters, as a "lake" trout, and any trout that lives in a stream or brook—even cutthroats and browns—as a "brook" trout.

No wonder people get confused.

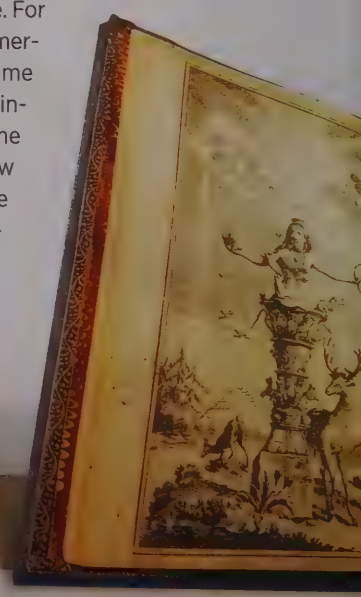
Even experts disagree

"There really are no rules for common names, and that leads to some issues," Dr. Joe Mendelson, director of research for Zoo Atlanta, writes on the zoo's popular blog. "Taxonomists can be very territorial and dogmatic about their preferred names for the creatures they study, and the debates can get ferocious."

Hyphens are particularly troublesome. For instance, some biologists with the American Ornithological Society still fume over the organization's decision to include a hyphen in the common name sage-grouse (apparently done to show the close relationship between the bird and its fast-vanishing sagebrush-steppe habitat).

So many lookalikes

Some nicknames, meanwhile, arise from people not knowing or caring about the differences among ani-



ternational Code of Zoological Nomenclature (ICZN), which ensures a species has just one official scientific name and that names can't be changed without extensive discussion among taxonomists.

DIGITAL COMPOSITIONS WITH PUBLIC DOMAIN IMAGES BY LUKE DURAN. BROWN TROUT ILLUSTRATION BY H.H. LEONARD, 1914

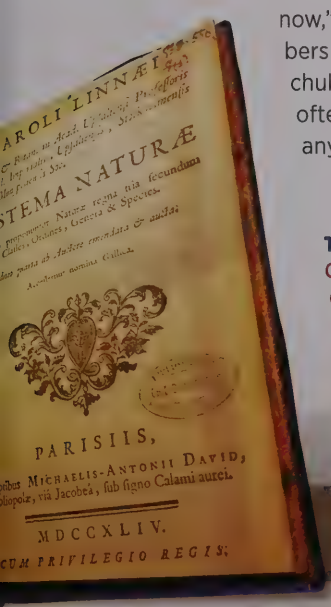
NEW KNOWLEDGE

Because what people call animals is a personal preference, there's really no wrong or right term. Of course, there are errors of identification, like when I catch what I think is a longnose sucker and call it that, when in fact it's a mountain sucker. But if anyone wants to call a sage-grouse a "bomber" or porcupines "quill pigs"—just for fun or because people in their region have always done so—no one will stop them.

At the same time, many people enjoy learning and using the official common and even scientific names for Montana's fish and wildlife and what those terms reveal about different species. For example, what many people commonly refer to as "horny toads" are actually greater short-horned lizards. Lizards, as it turns out, are reptiles, with scales, while toads (and frogs) are scaleless amphibians. "We find that kids, especially, love learning names for fish and wildlife," Bowditch says. "They get that empowerment of new knowledge—and then get to go back home and share what they've learned with their parents and friends." 🐻

mals. Though Montana is home to more than a dozen different gull species, like the ring-billed and Iceland, many people call all white, long-winged birds soaring over box store parking lots "seagulls." Others commonly refer to any small brown bird as a "sparrow," "LBJ" (little brown jobber), "LBB" (little brown bird), "dickey bird," or "tweety bird," even though dozens of unique species live here. (The generic labels are no surprise, though. Many prairie songbirds, especially, look amazingly alike, often challenging even expert birders.)

Anglers often dub any small fish a "minnow," even though Montana's only true members of the minnow family are daces, shiners, chubs, and a few other species. Anglers also often incorrectly apply the name "carp" to any lipped fish they catch, like a longnose sucker, smallmouth buffalo, or shorthead redhorse (all members of the sucker family).



THE CLARIFIER *Systema Naturae*, by Carl Linnaeus, 1744, on display at the Musee de l'Homme, Paris. The Swedish naturalist revolutionized animal nomenclature by devising a two-name system for every species using Greek and Latinized genus and species names that could be understood by scientists throughout the world.

More misnomers

Adding to the nomenclature mess are the nicknames for males, females, and young of some species. Male bears are often mistakenly called "boars" and females "sows," remnants of the age-old myth that bears are related to pigs. And male, female, and young mountain goats, only distantly related to domestic goats (and more closely to bison), are known as "billies," "nannies," and "kids."

A few senior anglers in Montana still call walleye "walleyed pike" and sauger "sand pike"—century-old Midwestern names based on the mistaken belief that the two species, due to their sharp teeth and elongated body shape, were related to northern pike (when in truth they are members of the perch family). Midwestern anglers visiting Montana sometimes call goldeye "skipjack herring" because they resemble these silvery, flat-sided fish of that region's larger rivers.

Some people mistakenly think great blue herons, with their long legs and thin necks, are cranes. One FWP wildlife biologist reports that some older Montanans in her region still refer to bats as "flying mice" (though bats are not rodents), a myth reinforced by an old German word for bat, *fledermaus*, meaning "fluttering or flying mouse," made famous by Johann Strauss's opera *Die Fledermaus*. ■

LIFE AFTER DEATH

The amazing productivity of dead trees, both standing and fallen. By Ellen Horowitz

High on a ridgetop, the silver skeleton of a wind-scoured pine beckoned. As I walked beneath its thick, gnarly branch stubs, my hand followed the sleek contours of the tree's twisted trunk until I came upon an old woodpecker hole. It was late summer, nesting season was long over, and I couldn't resist the temptation to ask, "Hello, is anybody home?" Feeling certain no one was, I followed the question with a gentle knock. The unexpected answer—a bat—shot out of the hole.

I don't know who was more surprised—the bat or me—but that long-ago moment still reminds me of just how many animals rely on dead trees. In Montana, more than 60 species of wildlife use dead trees or logs for feeding, nesting, roosting, resting, denning, or drumming.

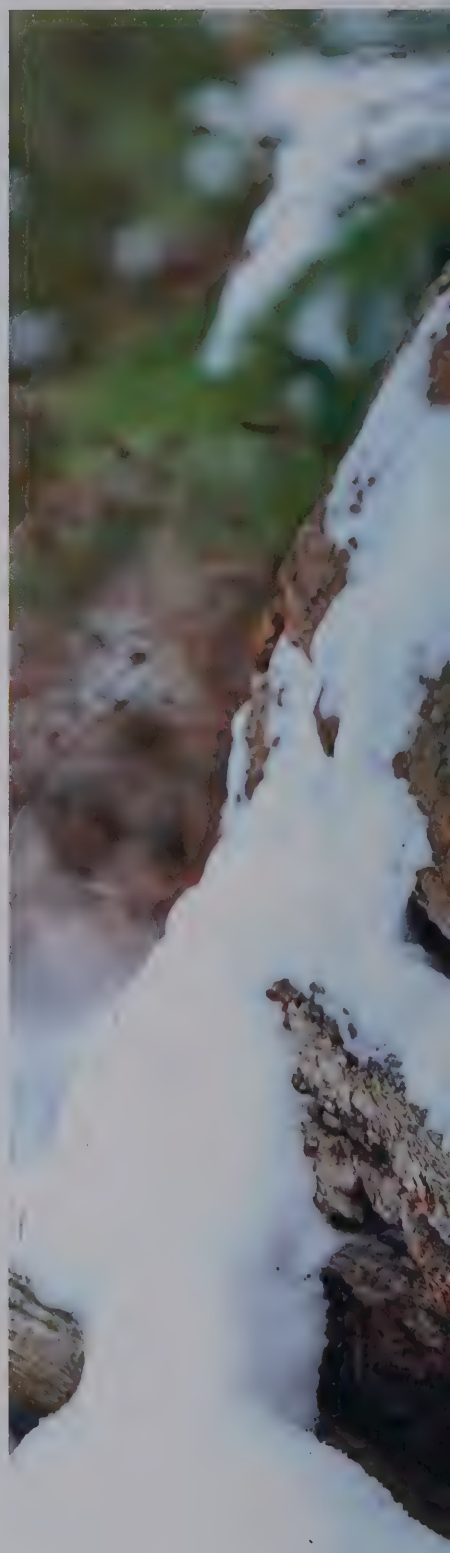
Standing dead trees (commonly called snags) and downed logs are the overlooked and underappreciated life-giving parts of any forest. Living trees with heart-rot decay, broken or dead tops, and large dead branches also function as snags. And they too can be filled with wildlife.

Everyone knows that healthy live trees are wonderful for wildlife. Birds nest in their branches, insects eat the leaves, and the trees convert carbon dioxide into oxygen that all life on earth needs. What makes dead trees so valuable to wildlife are the small and large holes and cavities that provide shelter for birds, squirrels, bats, and even bears. Openings also allow moisture and fungi to get inside the structure and trigger rot and decay that attract insects eaten by wildlife.

"Believe it or not, a dead tree often holds more living creatures than a similar-size live tree," says Torrey Ritter, regional nongame wildlife biologist for Montana Fish, Wildlife & Parks in Missoula.

Woodpeckers, with their chisel-like bills, are renowned for drilling holes in trees, which they and other wildlife use for roosting and nesting. Fungi that cause decay also create cavities that house dozens of species. These openings can range in size from small knotholes to entire hollow trees. Almost any injury to a tree's protective bark—caused by fire scars, lightning strikes, storm damage, insects, antler rubs, bears, and humans—can produce openings for ecologically essential fungal spores.

Fungi perform the critical job of decomposing and recycling forest nutrients. Some mycorrhizal fungi transport nutrients to trees and other plants to help



LEFT TO RIGHT: JEREMI HOLLMAN; GARY KRAMER

PREDATORS' PREFERENCE Forest carnivores like American martens (above) and fishers den in fallen tree cavities and prey on small mammals attracted to logs.

THE LIVING FOREST Organisms that use dead trees and stumps include, from left to right, various mushroom species, red-breasted nuthatches, Lewis's woodpeckers, and northern flickers.

them grow. But it's the decay-creating fungi that give "primary" cavity nesters—woodpeckers, flickers, and sapsuckers—a chance to make their holes. Without decay, even the strongest woodpecker wouldn't be able to excavate tree trunks. Some studies suggest that woodpeckers may even "soften" dead trees by transporting fungi they pick up on their beaks from infected trees.

KEYSTONE SPECIES

Woodpeckers—a family that includes flickers and sapsuckers—evolved to drill tree holes. Their stout bills pound into and gouge out wood, and their musculoskeletal structure prevents whiplash and headaches from repeated hammering. The birds' toes provide grip for clinging and walking up tree trunks, and the powerful tail braces the bird's lower body against the tree to offset the forward strokes of the head.

> "Believe it or not, a dead tree often holds more living creatures than a similar-size live tree."

Woodpeckers are often described as keystone species or keystone architects because their holes are essential for a variety of "secondary" cavity users. These songbirds, raptors, waterfowl, and small mammals cannot excavate new cavities themselves but use existing ones for nesting, denning, or shelter. Researchers estimate that about 25 percent of bird species nesting in the Northern Rocky Mountain forests are cavity nesters. "Loss of a keystone species like the pileated woodpecker could lead to cascading effects including harm to other species," Ritter says.

CREATING MORE CAVITIES

Nest cavities provide better protection from the elements and predators than open nests. A typical woodpecker nest consists of an entrance hole and a short horizontal tunnel leading to a vertical pouchlike chamber within the tree trunk. The entrance is chiseled out just wide enough for the woodpecker to slip through.

Most woodpeckers excavate a new nest hole each spring, leaving their previous years' models as turnkey homes for other wildlife. Western and mountain bluebirds, tree and violet-green swallows, and house wrens are just a few of the secondary cavity nesters that use the old nests. Once these birds claim a suitable abode, they build their own nest atop the woodchips left behind by the original architect and occupant. Chickadees and nuthatches also use woodpecker or natural holes (though both can whittle their own original nest cavities in soft, decayed wood if necessary).

North America's largest woodpecker, the pileated, needs large-diameter trees for its massive interior nests. The pileated's egg-shaped entryway measures about 4 inches high and 3.5 inches wide. The spacious nesting chamber, chiseled into decaying heartwood, averages 18 to 24 inches deep and 8 inches wide. It takes three to six weeks for the woodworkers to complete construction. The cavernous nests are later used by wood ducks, buffleheads, goldeneyes, and hooded mergansers, as well as northern pygmy, northern saw-whet, flammulated, screech, and boreal owls.

Studies in northwestern Montana's western larch (tamarack) forests show that a 20-inch-diameter tree is usually more than 200 years old, and that pileated woodpecker nest trees average 29 inches in diameter. Unfortunately, such old, large trees are uncommon in many managed forests.

Northern flickers are Montana's second largest woodpecker and the one most common in many forests. Some smaller ducks and raptors make do with a flicker's more cramped quarters when nothing else is available.

A large tree perforated with cavities becomes a high-rise condo for multiple species if there's sufficient distance between holes.

Mountain bluebird

Ellen Horowitz is a writer in Columbia Falls.

CLOCKWISE FROM TOP LEFT: RICK CLARK; ALEX BADYAEV; ERIN BRAATEN; DONALD M. JONES

FAMILY AFFAIRS Snags can provide homes for dozens of bird species, including (above left) pileated woodpeckers and (above right) wood ducks.

CLOCKWISE FROM TOP LEFT: DANIEL ELLISON; GARY KRAMER; KERRY T. NICKOU

Researchers in northwestern Montana documented a red-naped sapsucker, a tree swallow, and a mountain chickadee all nesting in a single western larch snag. Researchers in the Bitterroot Valley documented Lewis's woodpeckers nesting in a tree with one to three other bird species, including an American kestrel. Near Missoula, researchers recorded a northern pygmy owl and a northern saw-whet owl simultaneously nesting in the same snag. The pygmy owl took the west-facing cavity about 8 feet up while the saw-whet chose an east-facing cavity 19 feet above ground level.

Birds aren't the only wildlife using tree cavities. Shannon Hilty, FWP regional nongame wildlife biologist in Great Falls, says that at least eight of Montana's 15 bat species use cavities or crevices within snags for roosting. "These features provide vital habitat for female bats raising pups," Hilty says. Flying squirrels, tree squirrels, and American martens use tree cavities for denning, resting, and protection. Raccoons, porcupines, short-tailed weasels, mice, and bushy-tailed woodrats also shelter in woody openings. The list goes on and on.

Northern flying squirrel

OTHER USES OF SNAGS

Almost every part of a dead tree is a type of habitat. Exposed high branches provide hunting perches for kestrels, hawks, and bald eagles. The Lewis's woodpecker, unlike most members of its family, launches from its perch to snatch insects midair before returning to the branch to dine.

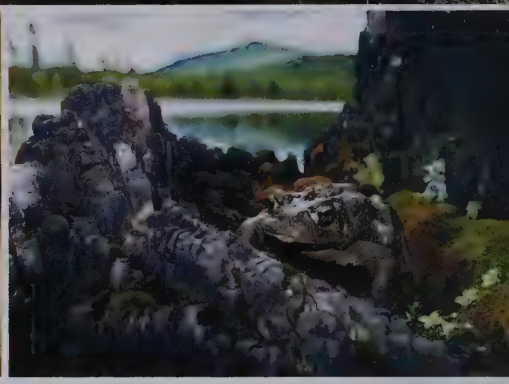
Treetops are used for musical performances in springtime. An olive-sided flycatcher's easy-to-recognize song resembling the phrase, "*Quick, three beers*," carries long distances from a high perch. Some woodpeckers select trees with large, hollow branches as drumming towers to advertise territory and announce themselves to mates or potential mates.

A broken-topped tree is one of the few natural platforms that can support an osprey's large stick nest. Great gray owls also use large, broken-topped snags for nesting, if located near a forest edge suitable for hunting.

Flocks of Vaux's swifts require large, hollow old-growth conifers or cottonwoods for communal roosting and nesting. The opening and cavity must be big enough to allow dozens or even hundreds of birds to fly in and out. As nightfall approaches, the swifts begin to swarm, moving in unison through the sky until making a final spiraling descent into the tree. Once inside, they cling vertically to the interior walls with their tiny claws.

Bears will overwinter in hollow or partially hollow trees, or in tree openings as high as 50 feet above ground. In 2018, a webcam in Glacier National Park kept tabs on a black bear waking up from his long winter sleep in a hollow tree (see the video by scanning the QR code on the "Hollow homes" sidebar, page 27).

Another habitat is hidden where loose bark recedes from the trunk of a large dead or dying tree. This specialized space is used by brown creepers, the only North American birds that construct nests behind sloughing bark. Several bat species, including the long-eared myotis, little brown, and silver haired, also squeeze themselves behind loose snag bark to roost.



MORE CRITTERS Clockwise from top left: American kestrel emerging from a cavity; ruffed grouse drumming on a downed log; boreal toad in a charred stump depression that gathers water; yellow-pine chipmunks keeping an eye out for predators; bull trout hiding from otters and ospreys under downed dead branches and logs; a great gray owl with two chicks in a broken-top tree.

WHEN A SNAG TOPPLES

Even when a dead tree falls, its story continues. As world-renowned forest ecologist Jerry Franklin, a professor emeritus at the University of Washington in Seattle, wrote, "At the time a tree dies, it has only partially fulfilled its potential ecological function." Even forests with vast numbers of dead trees—like those hit by severe beetle kill or wildfire—are considered healthy by forest ecologists.

For instance, male ruffed grouse conduct their springtime drumming display atop downed logs—something they can't do when a tree is live and upright. Juncos frequently choose nest sites in the space underneath partially supported logs.

Logs, stumps, and large fallen tree limbs create miniature overpasses and highway systems that allow squirrels and chipmunks to race across the forest floor, as well as places for small rodents to sun, eat, and watch for predators.

This "coarse woody debris," Hilty says, is especially critical to voles, shrews, and mice that remain active throughout winter. "It can create a more extensive 'subnivean' [beneath the snow] space that provides foraging habitat and pockets of different sizes and pathways." American martens and fishers in turn hunt the small rodents in the woody structure.

> "At the time a tree dies, it has only partially fulfilled its potential ecological function."

Fish also benefit from dead trees that topple into mountain streams and rivers. Bull trout, especially, use this underwater cover to hide from predators like otters and ospreys. Wind blows ants, beetles, and other insects that feed on downed trees and branches into streams, providing essential protein for many fish species.

Toppled trees also create stream pools and side channels, while rootwads of fallen trees are used by otters, mink, American dippers, Pacific wrens, and other animals.

Many other forest organisms find hidden habitats within and beneath logs. Fungi begin the decomposition process. Mites, spiders, snails, slugs, millipedes, and pill bugs are detrivores that dine on the decaying organic matter. Carpenter ants, often

CLOCKWISE FROM TOP LEFT: JAY STYLES; DONALD M. JONES; JEREMY ROBERTS; JOHN LAMBING; PAT CLAYTON; DONALD M. JONES

ORGANIC MATTER EATERS Centipedes, millipedes, sow bugs (above), slugs, snails, earthworms, and a wide range of insects, such as earwigs, ground beetles, and springtails, are detrivores that eat dead trees and provide food for birds and other wildlife.

mistakenly blamed for eating trees, are simply taking advantage of easy digging within a log or stump's soft, fungus-infested heartwood to build their nests. In the forest, carpenter ants play a beneficial role by preying on other insects and recycling organic matter. They also provide protein-rich food for pileated woodpeckers and bears.

Another thing logs do is soak up water like a sponge, helping them retain moisture even during summer drought. Salamanders, rubber boas, and boreal toads burrow or shelter beneath the cool, moist logs to wait out the heat of the day.

Finally, logs turn into soil. Slowly decomposing over the course of decades or centuries, the downed tree trunks enrich the forest floor while supporting the growth of lichens, mosses, and mushrooms on their surfaces. In moist forests, they serve as nursery logs, providing seedbeds for other plants, including trees, to get their start

"Dying and dead wood provides one of the...greatest resources for animal species in a natural forest," wrote Charles S. Elton, a British ecologist and contemporary of Aldo Leopold. "[If] fallen timber and slightly decayed trees are removed, the whole system is gravely impoverished of perhaps more than a fifth of its fauna."

The next time you come upon snags while walking through the woods, don't mourn for the dead trees. Celebrate the life those vital habitats are giving to wildlife today—from songbirds to black bears—and will continue to give, even when toppled and decayed, far into the forest's future.

RENEWAL Even trees grow from old, dead trees, completing a full circle of forest life.

Hollow homes

A "hollow" tree is defined as one with such advanced decay throughout its interior heartwood that a hollow core forms. Biologists consider large-diameter (20-plus inches) hollow trees especially useful to wildlife. Studies in northeastern Oregon indicate that roosting and nesting Vaux's swifts require a tree averaging 27 inches wide and 85 feet tall. Hollow treetops for denning black bears average more than 43 inches wide and 57 feet high.

Hollow snags and hollow logs always start with a live tree. The hollowing process begins when the live tree is damaged. Strong winds, for example, may snap off a treetop or large branch, exposing it to airborne heart-rot fungal spores. Deep fire scars at the tree base can also create an opening for fungal spores. These fungi do their work only in live trees.

After many decades, the decayed heartwood detaches from the sapwood, resulting in a hollow chamber. Since the live outer sapwood isn't affected, the tree retains its hard, protective shell while continuing to grow. In other words, a tree can be hollow and still very much alive.

Because they look intact from the outside, hollow trees can be tough to identify unless there's an obvious opening. But they are worth finding, because these trees always house some sort of wildlife. Look for live trees with:

- a broken top,
- evidence of multiple pileated (or other) woodpecker cavities,
- appearance of shelf fungi close to branch stubs or live branches, or
- hollows (knotholes) where large branches have broken off. ■

A black bear peers out from its den in a hollow log.

Scan the QR code at left to see a sleepy black bear emerging after hibernation in a large Glacier National Park snag cavity.

CLOCKWISE FROM TOP LEFT: KATJA SCHULZ; SHUTTERSTOCK; RICK CLARK

THE TROUBLE

Wind power generates electricity while reducing carbon emissions, but the spinning rotor blades pose a threat to raptors and bats. Research and collaboration are helping reduce losses. BY JULIE LUE

The scene could be anywhere in central Montana. A rough-legged hawk cruises over an open field. A passing car on a dirt road startles a herd of pronghorn, which sprint a few hundred yards before stopping. On a nearby hillside, black Angus amble past a parked tractor.

But behind these cattle, on the lower slopes of the Highwood Mountains, giant wind turbine towers rise more than 20 stories above the surrounding landscape. Their immense white rotors, each as long as a football field, spin tirelessly in the stiff breeze.

Spion Kop Wind Farm, owned and operated by NorthWestern Energy (NWE), about 40 miles southeast of Great Falls near Raynesford, is one of a growing number of facilities putting Montana's infamous winds to work. As the United States pushes to reduce carbon emissions, the same winds that parch fields, fan wildfires, and blow blizzards are gaining attention as a valuable source of energy.

But that clean, green, renewable energy comes at a cost. The turbines' massive components must be built, transported, and installed—and then recycled or scrapped, as wind farms are eventually decommissioned or repowered (upgraded). Linking wind farms to energy markets may require building new transmission lines. And, of keen interest to biologists with Montana Fish, Wildlife & Parks, the construction and operation of wind facilities can displace terrestrial wildlife and kill birds and bats as they collide with the rotor blades, whose tips rip through the sky at up to 180 miles per hour.

SEEKING SOLUTIONS Right: Fairfield Wind Farm near Freezout Lake. As green wind energy production increases across Montana, utilities and wildlife agencies are working to find ways to reduce mortality of golden eagles (top) and hoary bats (above).

Fortunately, harm to wildlife can be significantly reduced, says Kristina Smucker, FWP Nongame Wildlife Bureau chief. The department has no regulatory authority over wind farms, but FWP and the Montana Natural Heritage Program have granular knowledge of local wildlife and habitats that wind developers and operators can use to create less-harmful facilities. "Extensive research has given us a lot of tools to make sure wind and wildlife are as compatible as possible," Smucker says.

RAMPING UP

Montana's wind, dubbed "world-class" by the Oregon-based clean energy advocacy organization Renewable Northwest, ranks fifth nationwide for land-based wind energy potential, according to a report by the National Renewable Energy Laboratory (NREL). But Montana ranks only 21st among the 50 states for installed wind power capacity. We have the wind, but currently not enough turbines or transmission lines to take full advantage of it.

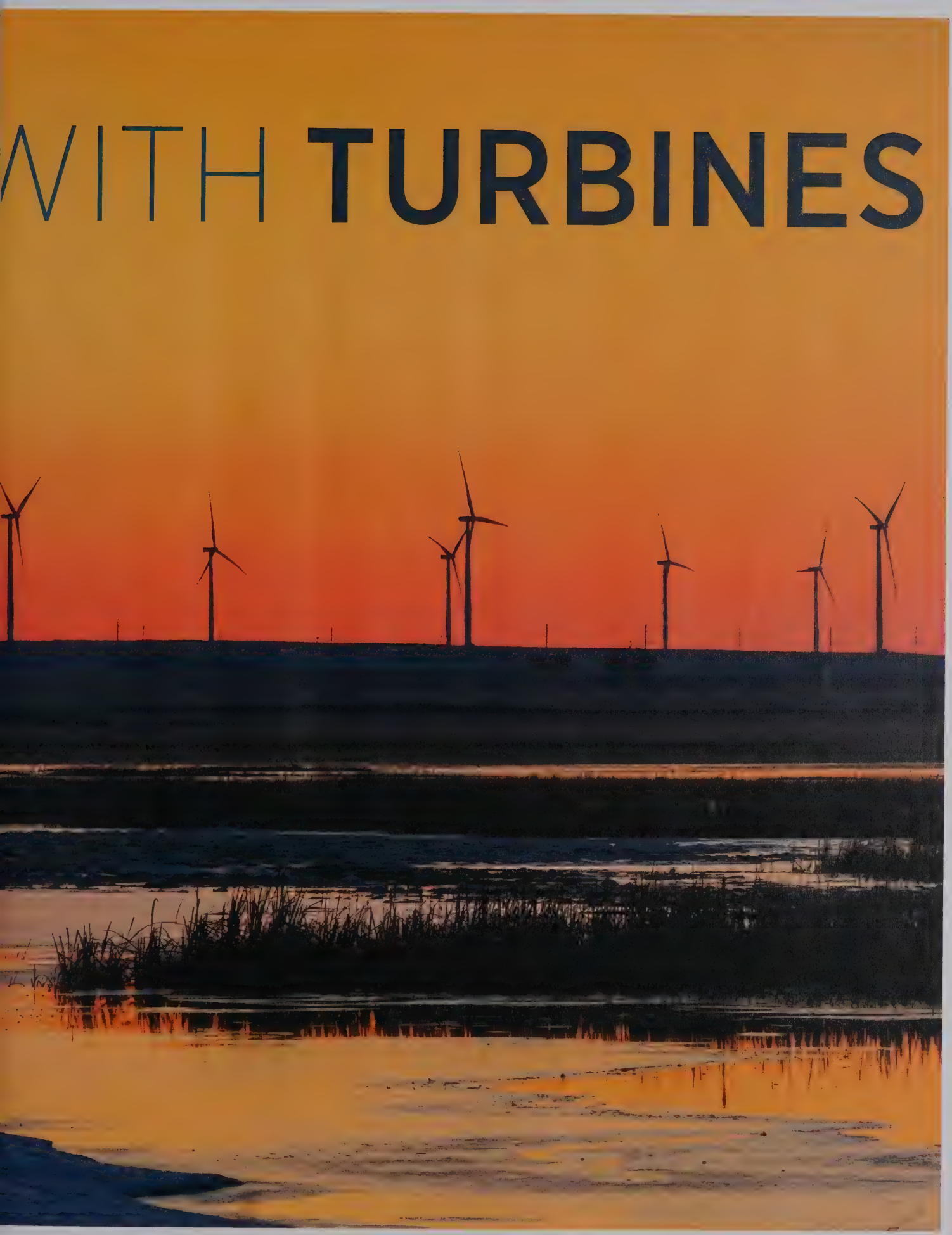
There's currently about 1.4 gigawatts (GW) of wind power capacity operating in the state, with another 4 GW or so in development. (One GW of capacity can power roughly 300,000 homes.) Some proposed projects may never break ground.

"Whether or not all of the projects under development come to fruition depends on a number of factors, including the cost of transmission interconnection and whether the project is selected as a finalist in a utility's request for proposals," says Robin Arnold of Renewable Northwest. Still, there's plenty of interest in harnessing Montana wind to produce electricity, especially with the recent extension of federal renewable energy tax credits.

Most of Montana occasionally experiences tree-snapping, shingle-shredding gales, but profitable power generation requires more constant wind. Anyone who

CLOCKWISE FROM TOP LEFT: DAN NICHOLS; ESTELLE SHUTTLEWORTH; NATHAN COOPER

WITH TURBINES



has spent time along the Rocky Mountain Front knows that the state's most consistently strong winds blow off the east face. Many wind farms are clustered along a line from Cut Bank south through central Montana. Eastern Montana is also seeing significant development, including the state's newest and largest wind facility, Clearwater, northwest of Miles City.

SMART SITING

Biologists don't know exactly how concentrations of wind facilities in central and eastern Montana affect all the wildlife that use these areas. But they do know that turbine blades kill birds and bats. And they know that choosing the right site—for wind farms or even individual turbines—can reduce mortality. In its voluntary guidelines for wind energy facilities, the U.S. Fish & Wildlife Service (USFWS) offers siting advice. The agency also recommends monitoring sites for two years before and two years after construction to predict and evaluate effects on wildlife. When wind developers consult with the USFWS in Montana, FWP biologists usually sit in, says Allison Begley, an FWP avian conservation biologist based in Helena.

Julie Lue is a writer based in the Bitterroot Valley.

> "Research shows that bats may even be attracted to turbines."

GATHERING INFORMATION
Right: An FWP researcher holds a live hoary bat found during a 2017 study at Spion Kop, 40 miles southeast of Great Falls. Top: Spion Kop this past winter.

Both wildlife agencies encourage utilities to keep wind farms away from intact native prairie, which provides important habitat for at-risk bird species such as ferruginous hawks, long-billed curlews, and Sprague's pipits. "We don't have a definitive sense of how these species will react to the building or presence of turbines, but they probably won't like it," Begley says.

Wind farms built on agricultural or range lands don't fragment native grasslands, "and private landowners benefit from the leases," Begley adds.

The wildlife agencies also recommend that wind energy developers pay close attention to how birds and other species use an area. "For instance, with eagles, we encourage companies during the planning phase to understand how the raptors use the area before they start construction," Begley says. "It's pretty hard to put down a wind farm anywhere in Montana where eagles don't fly at least occasionally."

Bald eagles are doing well overall in Montana and nationwide, their numbers tripling in the Treasure State since 1997. But according to a USFWS report, "The current rate of golden eagle mortality raises concerns as to whether [the population] can remain stable." Threats to the raptors

FROM TOP: JOHN WARNER; MONTANA FWP

HOW A WIND TURBINE SPINS—AND STRIKES

A typical wind turbine consists of three 100- to 150-foot-long blades affixed to a generator atop a 250- to 300-foot-tall tower rooted in an underground foundation. Between the blades and the generator, in a box called a nacelle, is a hub that collects the kinetic energy, which the generator converts to electricity.

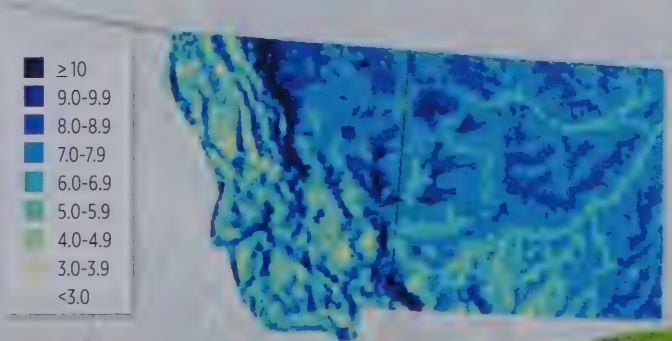
Wind turbines situated in major migration routes or near nesting areas can kill eagles, other raptors, songbirds, and bats. The rotor blade tips can reach deadly speeds of more than 180 mph.

Power companies can lessen the harm by siting turbines away from migration routes and other areas heavily used by the birds, and by not spinning turbines during peak bat migration except when it's too windy at night for bats to fly. Some utilities install automated detection systems that stop the blades when flying wildlife approach, or use audible or ultrasonic deterrents. ■

The rotor blade tips spin at up to 180 mph and may strike eagles.

The spinning blades can also strike bats.

Average wind speed (meters/second)



WHERE THE WIND BLOWS
The map above shows where Montana experiences the highest consistent wind speeds (darker shades of blue). Not surprisingly, most of Montana's 800 existing wind turbines and proposed sites are along the Rocky Mountain Front and in the central part of the state.

PHOTO ILLUSTRATION BY LUKE DURAN; WIND DATA: NATIONAL RENEWABLE ENERGY LABORATORY (NREL)

include illegal shooting, lead poisoning from bullet fragments when the birds scavenge big game animal carcasses, electrocution by power lines, and collisions with cars.

Now add wind farms. "Golden eagles seem more prone than bald eagles to collisions with turbines," Begley says. One reason may be that golden eagles are more common along the Front and in central Montana, where most of the state's roughly 800 commercial wind turbines are located.

Fortunately, there are ways to reduce collisions between eagles and turbine blades. "The best mitigation always happens before a build, when you're looking at where eagles are most active—either nesting or migrating," Begley says. "If energy developers do rigorous surveys to find out where the birds are frequently flying, they can use that data to build in the best, least-intrusive places."

DATA DRIVEN Invenergy constructs a wind turbine near Judith Gap; golden eagle nest; a raptor soars past a wind tower at Spion Kop. Energy companies use FWP data to keep sites away from migrating or nesting areas.

> "The best mitigation always happens before a build, when you're looking at where eagles are most active—either nesting or migrating."

FIRSTHAND KNOWLEDGE

While risks to eagles and other raptors have been broadly publicized over the past two decades, birds aren't the only winged wildlife species showing up dead at the base of wind turbines. Bats also are casualties. Unfortunately, monitoring before construction has not been as effective in predicting how the winged mammals will use an area once rotor blades start spinning. "Research shows that bats may even be attracted to the turbines," Smucker says.

Biologists learned about the effects of turbines on bats and other wildlife at the 25-turbine Spion Kop Wind Farm, after NWE, the state's largest utility, contracted the department to perform post-construction monitoring from 2015 to 2017. "If we build something, we want to build it right," NWE biologist Sam Milodragovich told the *Great Falls Tribune* in 2017. "We want to know what the risks are and how we can minimize the impacts."

Developers and operators generally hire private environmental consultants to conduct these studies. But Milodragovich, now retired, asked FWP to run the two-year study because all the data would remain in the public record (scan the QR code on page 34 to view the final report).

The advantage to FWP, Smucker says, was conducting a study that provided important information on wildlife and wind turbines. "And for Sam, it was also a logical continuation of his tireless work to make energy production and transmission safer for wildlife—especially raptors."

Milodragovich worked for more than two decades to protect raptors and other birds from being electrocuted by or colliding with the utility's power lines, Smucker says. "He pushed to identify and retrofit power poles that were the worst offenders, even going so far as to help train engineers and linemen. And he's a big reason people now see ospreys nesting on platforms next to power poles across Montana."

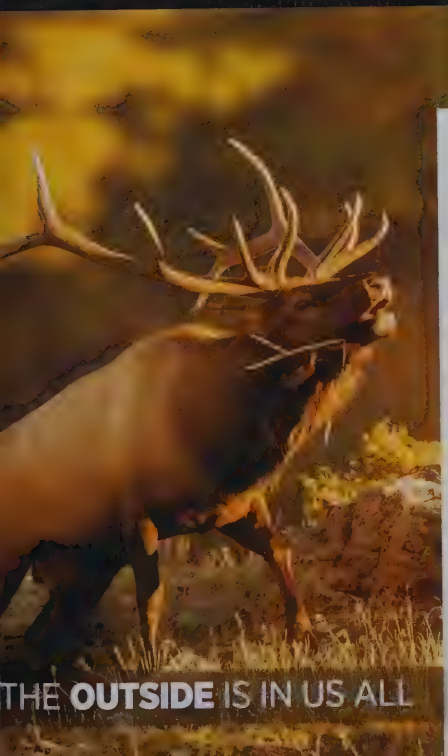
During Milodragovich's tenure, NWE installed statewide more than 150 such platforms, which allow ospreys to nest next to potentially deadly power poles instead of directly on top. "He was also one of a small number of early advocates who pushed to make wind development more compatible with raptors," Smucker adds.

At Spion Kop—named for a nearby ridge that resembles a notable site from the Boer War in South Africa—FWP biologists monitored wildlife use on lands at and surrounding wind turbine locations. They also looked for bird and bat carcasses below the structures and estimated total deaths per turbine.

The two-year study showed that few birds were killed by the Spion Kop turbines. No dead raptors or threatened or endangered species were found. But bat mortality was higher than expected when compared to that at other wind farms in Rocky Mountain states. Some bat species fared worse than others.

Of the nine species that used the Spion Kop area, just two accounted for all 61 dead bats found on-site. More than 70 percent were hoary bats, a relatively large bat with white-tipped brown fur that is a Montana state species of concern. The rest were silver-haired bats. Both are migratory tree-roosting species that also make up the bulk

CLOCKWISE FROM TOP: INVENERGY; JOHN WARNER; SHUTTERSTOCK



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NEW TECH FOR A NEW GENERATION NWE biologist Sam Milodragovich speaks with Montana students about protecting birds of prey. Now retired, Milodragovich was instrumental in helping the utility reduce raptor mortality. The biologist notes that new technology such as thermal-imaging cameras mounted on wind turbines (above right) monitor bird and bat activity and automatically record the data to a computer in the turbine.

of bat deaths from wind turbines elsewhere in the United States.

FWP officials emphasize that estimating the number of bats killed by turbines is more complicated than simply tallying the number of carcasses found on the ground. "To figure out bat fatality rates at Spion Kop, we had to adjust the raw counts by factoring in our efficiency in finding carcasses and the amount of time carcasses persist before being scavenged," Smucker explains. "We estimated that 163 bats were killed during fall migration at that facility."

Bat fatality rates vary among wind facilities. At the 90-turbine Judith Gap Wind Farm, studies conducted in 2006-07 and 2009 estimated that a total of 925 bats were killed during spring and fall migrations combined.

Bats play a crucial role in ecosystems, devouring vast numbers of insects like cutworm moths and mosquitoes that plague crops and humans. "Bat researchers are concerned that if current fatality rates continue, species such as hoary bats could be listed under the Endangered Species Act," Smucker says. Allowing populations to decline to that point would not just be bad for the bats; a federal "threatened" or "endangered" designation would also create complex regulatory headaches for wind farm operators.

LIFE-SAVING CHANGES

Can Montana produce more clean wind power while killing fewer bats? A combination of local data and knowledge gained from other wind facilities, including some in Alberta, suggests that it can.

At Spion Kop, bats are much more likely to collide with turbines during peak migration in August and September. What's more, acoustic monitoring studies conducted throughout Montana show that bats don't fly during windy nights. Armed with that information, in 2020 FWP released its voluntary recommendations for reducing bat deaths at wind farms. A key suggestion is to increase "cut-in" speeds—the wind speed at which blades start to spin and turbines begin generating power—at night during August and September. During these times, the blades wouldn't start spinning

REDUCING EAGLE MORTALITY

Bald and golden eagles receive special protection under the Bald and Golden Eagle Protection Act (BGEPA), as well as that afforded most other bird species under the Migratory Bird Treaty Act. Under the BGEPA, it's illegal to accidentally kill or "take" an eagle, unless an entity has an "eagle take" permit. This federal permit allows a specified amount of eagle mortality without penalty as long as the permit holder takes certain steps to protect the birds and, in some cases, mitigate deaths by taking protective actions elsewhere—like by retrofitting power poles. "It's the same principle as a carbon offset program," says Dr. Marco Restani, NorthWestern Energy wildlife biologist. "If an industry is substantially polluting somewhere, they can buy carbon offset credits somewhere else, but in this case it's with eagles."

For their part, some wind power companies have installed automated detection systems that turn off turbines when eagles are flying nearby or use audible repellents that scare raptors away. "The detection systems and other sophisticated technologies are being used by more and more facilities to lessen risk to eagles," Kristina Smucker, FWP Nongame Wildlife Bureau chief, says. "At some facilities, they actually have employees who watch for eagles, pretty much constantly." ■

IdentiFlight systems can detect a bird as far as one kilometer away and identify it as a protected species such as an eagle.

until it's windy enough to discourage bats from flying. Elsewhere, this "curtailment" strategy has been shown to significantly reduce bat deaths with just a small decrease in power generation.

During August and September 2020, NWE adopted the curtailment strategy at Spion Kop and its other Montana wind facility, Two Dot, and again in 2021 and 2022. According to Dr. Marco Restani, NWE biologist, the utility increased evening cut-in speeds at Spion Kop and Two Dot from August 1 through September 30 to a level that, according to model results, avoids 90 percent of bat activity.

Smucker says adaptations like these are encouraging. "The NWE modifications are good news for bats, and something we hope more wind facilities will consider."

> "The NWE modifications are good news for bats, and something we hope more wind facilities will consider."

ACCOMMODATION Above: NWE wildlife biologist Dr. Marco Restani says the state's largest utility is adjusting its power generation to accommodate bats and avoid 90 percent of bat activity. Right: A wind turbine at night.

COOPERATION AND COMMUNICATION

Citing threats to wildlife and habitat from rising global temperatures, many conservation groups agree that resolving wildlife issues with wind generation is worthwhile. In a joint issue brief, the National Wildlife Federation and the National Audubon Society stated, "Responsible wind power is a key solution to addressing the threat of climate change to people and wildlife."

Helena-based attorney Chuck Magraw, a consultant for the Natural Resources Defense Council, says, "Runaway climate change, which a decarbonized energy system will prevent, poses a far, far greater threat to wildlife than wind power development."

But these organizations also agree that wind facilities must be designed and operated in ways that don't threaten wildlife, "especially birds and bats," says Montana Audubon executive director Larry Berrin.

Magraw says cooperation is key. "What is critical is communication and collaboration between the wind power industry and governmental entities as well as with nongovernmental organizations that know the landscape."

Smucker and other FWP officials encourage wind developers to reach out to the department early in their planning stages. "We know that more wind development is coming to Montana, and we want to see it done in a wildlife-friendly way," Smucker says. "Sure, there are challenges to making that happen, but there are also reasonable solutions to those conflicts if everyone sits down and talks them through."

ONE OF 61 FWP wildlife technicians document a bat carcass found at NWE's Spion Kop Wind Farm during a two-year study.

BIG TASK Left: A turbine blade is transported to a wind farm for final assembly. As more farms are built, utilities and wildlife officials will need to cooperate to ensure that bats and eagles don't become green-energy casualties.

Read the FWP report "Post-Construction Studies for the Spion Kop Wind Farm Project in Judith Basin County."

CLOCKWISE FROM ABOVE LEFT: NORTHWESTERN ENERGY; KEN CONGER; SHUTTERSTOCK; MONTANA FWP

Central Montana Welcome Mat

A new WMA acquisition opens access to 100,000 acres of prime state and federal wildlife land.

BY JIM PASHBY

MID-STATE MARVEL. The new WMA sits in the southern foothills of the Big Snowies between Lewistown and Ryegate.

Hunters, photographers, and other wildlife fans received an early Christmas present last year. In October 2022, the Montana Land Board approved the purchase by Montana Fish, Wildlife & Parks of a property in the southern foothills of the Big Snowy Mountains roughly 20 miles south of Lewistown. The $8.22 million acquisition, supported by the Golden Valley County Commission and the Montana Fish and Wildlife Commission, is FWP's newest wildlife management area.

In addition to the nearly 5,700 acres of prime elk and other wildlife range on the parcel itself, the new acquisition opens public access to tens of thousands of acres of neighboring federal land, including the 7,000-acre Twin Coulee Wilderness Study Area and the 87,000-acre Big Snowies Wilderness Study Area. Previously both areas were difficult to reach because they are surrounded by private ranches that granted no public access to the federal lands.

The newly acquired property contains habitat for pronghorn, mule deer, and black bears, as well as 22 animals listed by Montana as state "species of concern," including greater sage-grouse, long-billed curlews, mountain plovers, and Great Plains toads.

Jim Pashby is a writer in Helena.

FWP purchased the wildlife-rich property from Shodair Children's Hospital, which received it in 2019 as a donation from the Forrest Allen Estate.

FWP officials say that 75 percent of the purchase price will come from federal Pittman-Robertson Wildlife Restoration funds, with the other 25 percent coming from Habitat Montana, a state program funded by hunting license sales, and from private donations.

The Rocky Mountain Elk Foundation was instrumental in the deal, assisting Shodair through the complex land sale process, donating $150,000 to the purchase price and pledging $250,000 as startup funding for the new WMA's infrastructure and management. That work includes upgrades to wildlife-friendly fences laid out for rest-rotation grazing, as well as installation of additional water supplies that will improve the parcel for livestock and wildlife.

The Bass Pro Shops and Cabela's Conservation Fund and the Montana Fish & Wildlife Conservation Trust also donated $175,000 and $75,000, respectively, to the purchase price.

Governor Greg Gianforte, one of five members of the land board, asked that language in the deed stipulate that grazing will continue. The current grazing lease lasts until 2031, and the new deed includes a requirement that FWP develop a grazing plan that is beneficial to wildlife, with leases offered to neighboring landowners. Studies show that well-managed cattle grazing can benefit grasslands for wildlife.

"Not only does this land offer exceptional hunting opportunities, excellent habitat, and access to the Big Snowies elk herd, it will remain available for cattle grazing," Gianforte says. "Our state has a vested interest in seeing land conserved for wildlife habitat while also protecting ranchers on the landscape."

The property sits in a hunting district with more than 9,000 elk, the state's second largest herd. That may sound like good news, but in fact the herd is 10 times larger than FWP's population objective—the size biologists believe is both biologically sustainable and won't put undue strain on working ranches concerned about elk eating hay bales and alfalfa.

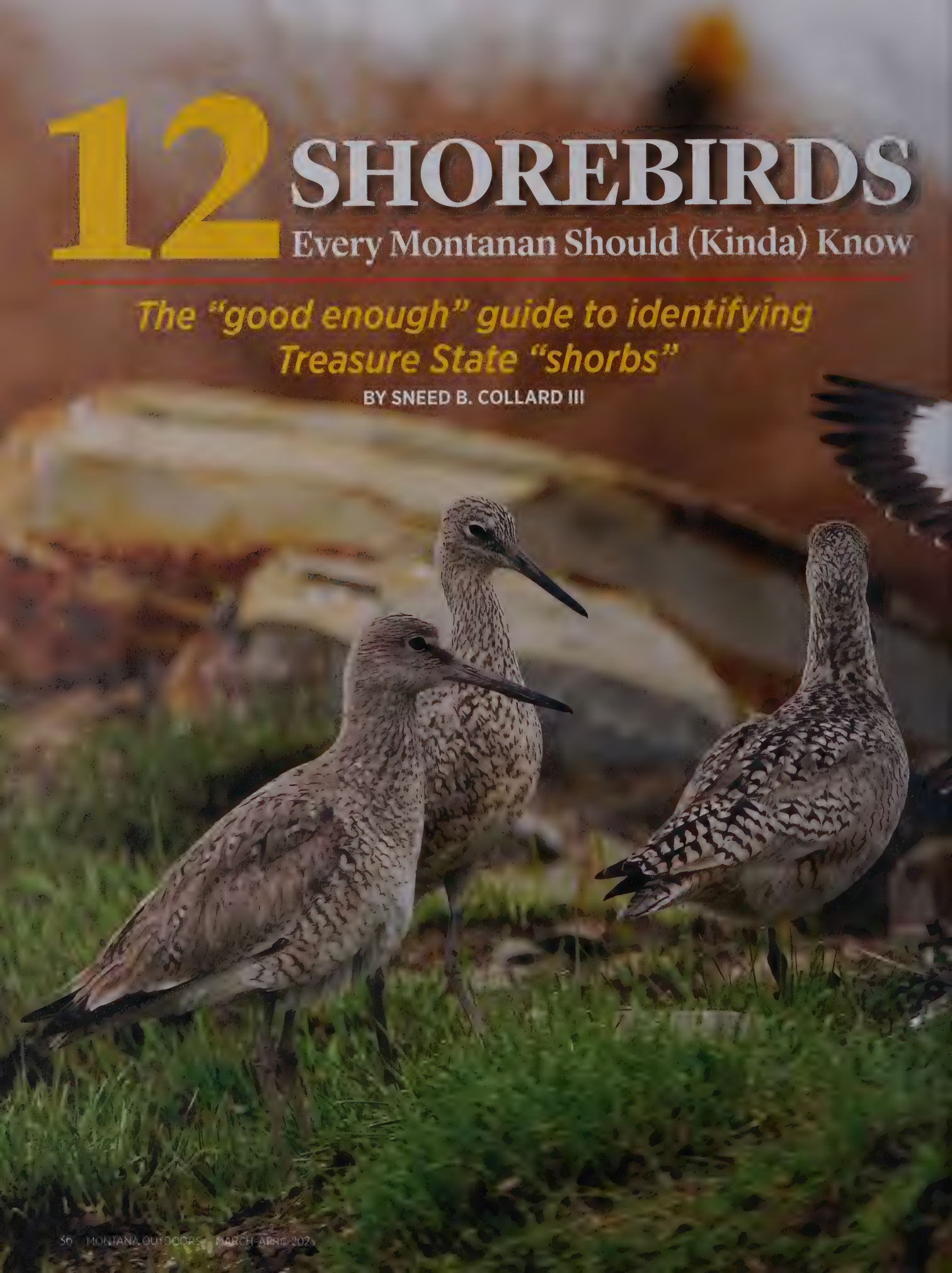
Another benefit of the state acquisition? It will allow public hunters to help FWP trim that herd to an appropriate size.

To protect habitat and allow wildlife undisturbed access to winter range, the Big Snowy Mountains WMA is closed each year to public recreation from December 1 through May 15. For the rest of the year, it is walk-in or horseback access only from two designated parking areas.

12 SHOREBIRDS Every Montanan Should (Kinda) Know

The "good enough" guide to identifying Treasure State "shorbs"

BY SNEED B. COLLARD III



EASY ID Though drab when standing still, the willet's distinctive black-and-white wing markings make the bird easy to identify when flying or flapping.

PHOTO BY RICK CLARK

My young son Braden, his friend Nick, and I were driving a dirt road south of Three Forks looking for burrowing owls, and we were striking out.

We had heard or seen plenty of sparrows, meadowlarks, swallows—even a northern harrier or two—but the owls eluded us. As we turned down a side road, Nick suddenly shouted, "Stop the car!" I braked and looked to where he pointed.

"Long-billed curlews!" Braden exclaimed.

My brain sputtered. *What? Shorebirds? In the middle of a field in central Montana?*

It didn't make sense, but there they were, and on their nesting ground no less. It was a revelation—and the opening chapter in my discovery of one of Montana's most interesting and unexpected bird groups.

FAR FROM SHORE

"Casual observers—nonbirders—are always surprised to find out about shorebirds in Montana," says Dan Casey, co-author of *Birds of Montana* and a biologist who has studied shorebirds in many capacities. "Most people think of all birds associated with water as being more coastally oriented. It happens with gulls. People will be in the middle of Montana and say they can't believe there are 'seagulls' there. The same thing happens with shorebirds."

A key reason for that surprise is that relatively few people ever get a chance to see what my son and I call "shorbs" in Montana. Many species pass through the state only during narrow windows as they migrate to and from nesting grounds in the Arctic. Of the dozen or so species that do breed in the Treasure State, most are incredibly picky about the wetlands they use, which means most people never encounter the birds. Several species—like that long-billed curlew we saw south of Three Forks—avoid wetlands altogether, preferring to nest in remote, dry grasslands. But that elusiveness doesn't mean a person can't find where these beautiful birds hang out and learn about their fascinating habits.

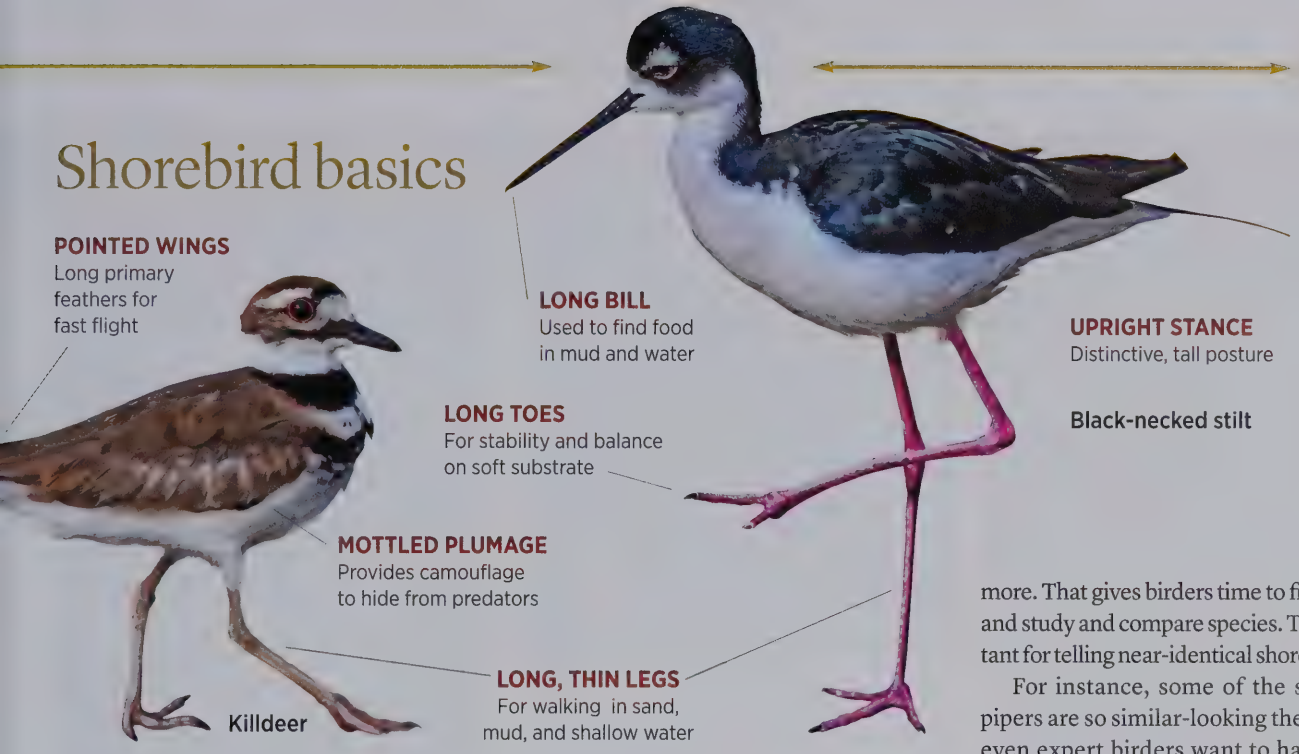
CONNECTING THE AMERICAS

Shorebirds are small to medium-sized birds that generally have thin bills and long legs. Most are smaller and more delicately featured than wading birds like great blue herons, cattle egrets, and bitterns.

The first thing to know about shorebirds is that they travel. Only killdeer and Wilson's snipe can be found in Montana year round, and while some shorebird species make relatively modest migrations to

JOHN CARLSON

Shorebird basics



the coasts, others rank among the world's most impressive migrating animals. "Many go not just to Central America, but to South America," Casey says. "They make you fully realize the connectivity of our world."

Shorebirds have suffered sharp declines because of wetlands destruction, agricultural conversion of prairie potholes, and long-term climate-related drought. Fortunately for Montana and visiting birders—not to mention the shorebirds themselves—Big Sky Country still holds significant amounts of important habitat. "Some of the larger reservoirs and refuges are key places that large numbers of these migrants use," Casey explains. "Places like Bowdoin, Benton Lake, and Medicine Lake [national wildlife refuges (NWRs)]—those really stand out, although Freezout Lake [state wildlife management area (WMA)] is also pretty darned important." These areas are also vital for Montana's breeding shorbs—and happen to be some of the best locations to observe these remarkable birds.

EXPLORING SHORBS

Like waterfowl, shorebirds often congregate in these and other areas and stay for weeks or more. That gives birders time to find the birds and study and compare species. That's important for telling near-identical shorebirds apart.

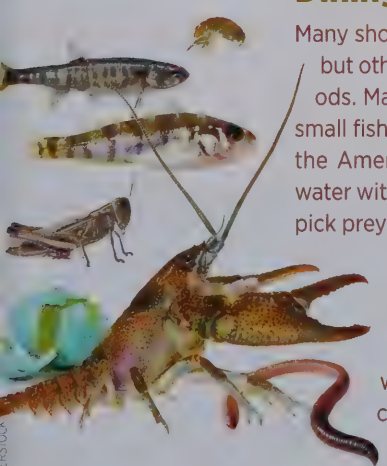
For instance, some of the small sandpipers are so similar-looking they can make even expert birders want to hang up their binoculars in frustration. But many shorebird species boldly differentiate themselves. Long-billed curlews, black-necked stilts, and American avocets are large, gorgeous "gateway" shorbs that beginners can easily identify. And only a little more effort will tease out differences among marbled godwits, upland sandpipers, and other species.

Spring can present large flocks of shorebirds such as Wilson's phalaropes, but "fall" migration—which actually occurs in late summer, when other birding often grinds to a halt—can be even more fruitful. "On a good day during the fall migration you can see 13, 14, 15 species of shorebirds in one wetland," Casey says.

A spotting scope is highly recommended. Keep it handy in the car, because shorbs can suddenly appear almost anywhere. The best Montana shorebird encounter my son and I ever had was in a large seasonal puddle next to a highway construction site only 10 miles from the North Dakota border. There, as a blazing sun set over the prairie, we saw 11 species—including a white-rumped sandpiper, a "life bird" (one that neither of us had ever seen).

Identifying shorebirds is definitely a challenge; even experts struggle sometimes. The descriptions on the following pages aren't definitive guides, but they will help you make a "good enough" guess as to what that long-legged, long-billed bird might be. ▶▶

Dining, shorebird style



Many shorebirds feed by probing sand or mud with their long bill, but others employ a surprising variety of alternate feeding methods. Many hunt by sight, picking off prey both underwater (like small fish) and on dry land (such as grasshoppers). Some, such as the American avocet, "scythe" back and forth through shallow water with their bills, snatching any food morsel they touch. Others pick prey off rocks or even snatch flying insects from the air.

In both their larval and adult stages, insects make up a significant part of many shorebird diets. But shorebirds tend to be opportunistic, also bagging a wide variety of crustaceans, worms, amphipods, and other invertebrates along with minnows found in lake or pond shallows. Long-billed curlews sometimes feed on eggs of other birds, and spotted sandpipers have even been known to scavenge on carrion. ■

Sneed B. Collard III, of Missoula, is the author of more than 85 books for children and adults, including the award-winning adult memoir Warblers and Woodpeckers: A Father-Son Big Year of Birding. *Keep up with his and son Braden's adventures at FatherSonBirding.com.*

IMAGES SPUTNIK/SHUTTERSTOCK

LARGE SHOREBIRDS (about crow-size)

LONG-BILLED CURLEW

Largest Montana shorebird. Brown or russet feathers and uniquely long, downcurving bill. Body length: 23 inches.

▶ **Key ID tip: Often confused with the marbled godwit. But the curlew's bill curves down while the godwit's curves up. Memory device: "curl-low."**

Habitat: Breeds on shortgrass prairie and rangelands, often far from water. Winters in wetlands in central Mexico and on both Mexican coasts down to Central America.

Worth knowing: Long-billed curlews are known for their mesmerizing, looping calls and showy aerial courtship displays. The birds once bred as far east as Michigan and as far south as coastal Texas, but habitat loss and market hunting decimated many populations by the end of the 19th century.

Best places to see them: Large agricultural valleys and grasslands in western, central, and northeastern Montana.

Montana conservation status: A Montana species of concern because of long-term population declines largely due to agricultural conversion of grassland habitat.

MARBLED GODWIT

Second largest Montana shorebird. Plain brown appearance and dark legs. Long, gently upcurving pink or orange bill with dark tip. Body length: 18 inches.

▶ **Key ID tip: Often confused with long-billed curlew. But the godwit's bill curves slightly up, while the curlew's curves down.**

Habitat: Breeds in the northern Great Plains in sparse grass close to wetlands. Winters along the Pacific and Atlantic coasts to Central America.

Worth knowing: Marbled godwits have some of the highest survival rates of any shorebird. Biologists have documented some tagged birds living up to 30 years.

Best places to see them: East of the Continental Divide, especially national wildlife refuges, north of I-90 and I-94.

Montana conservation status: Stable globally, with Montana numbers increasing between 1966 and 2010.

AMERICAN AVOCET

Black-and-white body, bill that visibly turns up near the tip, and, in breeding males, a distinctive rust-colored head and neck. Body length: 18 inches.

▶ **Key ID tips: In addition to the slender upturned bill, look for the broad black-and-white stripes on its back and the breeding male's rust-colored head and neck.**

Habitat: Breeds mainly in the interior West and Great Plains near shallow, often intermittent wetlands. Winters on both coasts of Mexico south to Central America.

Worth knowing: Avocets often feed on the water in compact groups.

Best places to see them: Benton Lake and Bowdoin national wildlife refuges and Freezout Lake WMA during breeding; almost any body of water during migration.

Montana conservation status: Secure in Montana.

CLOCKWISE FROM TOP LEFT: DONALD M. JONES; BOB MARTINKA; ERIN BRAATEN; NEAL & MJ MISHLER; RODNEY SCHLECHT; PAUL SIHLER

MEDIUM-SIZED SHOREBIRDS (about pigeon-size)

WILLET

Stocky, overall drab gray or buff, thicker bill than many other similar-sized shorebirds. Body length: 15 inches.

▶ **Key ID tip: Broad black-and-white wingstripes when flying.**

Habitat: Breeds in grasslands near wetlands in the Big Basin and the Great Plains; salt marshes, beaches, islands in New England. Winters on coasts south to South America.

Worth knowing: An ornithologist once told me, "If you don't know what else it is, it's a willet."

Best places to see them: Freezout Lake WMA plus Benton, Bowdoin, and Red Rock Lakes national wildlife refuges in breeding season.

Montana conservation status: Secure, though possibly declining.

BLACK-NECKED STILT

Black-and-white, slightly smaller than—and often accompanying—avocets, distinctive long pink legs. Body length: 14 inches.

▶ **Key ID tip: Nicknamed "tuxedo birds," these shorbs are extraordinarily tall and slender with black wings in flight.**

Habitat: Shallow wetlands. Year-round resident in California, Florida, Texas, Mexico, Caribbean, and South America. Also breeds in the Great Basin and in central Montana east of the Continental Divide.

Worth knowing: Black-necked stilts did not begin widespread breeding in Montana until the severe Great Basin (Nevada) drought of 1977.

Best places to see them: Freezout Lake WMA and Benton and Bowdoin NWRs during breeding.

Montana conservation status: Stable, but harmed by DDT residues, selenium, and other pollutants.

GREATER YELLOWLEGS

Vivid yellow legs, brown spotted back, pale spotted or streaked underparts. Body length: 14 inches.

▶ **Key ID tip: Those namesake legs.**

Habitat: Widespread aquatic locations during migration; breeds around ponds in boreal spruce forests; winters from coastal U.S. throughout Latin America.

Worth knowing: Larger size and slightly upturned bill distinguishes it from similar lesser yellowlegs and much smaller solitary sandpiper.

Best places to see them: Almost any body of water during spring and fall migration.

Montana conservation status: Thought to be stable, but very little data available. ▶▶

MEDIUM-SIZED SHOREBIRDS

UPLAND SANDPIPER

Tall erect posture; brown back with short yellow bill with dark tip; hyper-alert, almost comical stance and expression. Body length: 12 inches.

▶ **Key ID tips: The relatively short bill. One call resembles a slide-whistle. Often perches on fenceposts and can be visible as you drive past—even along a freeway.**

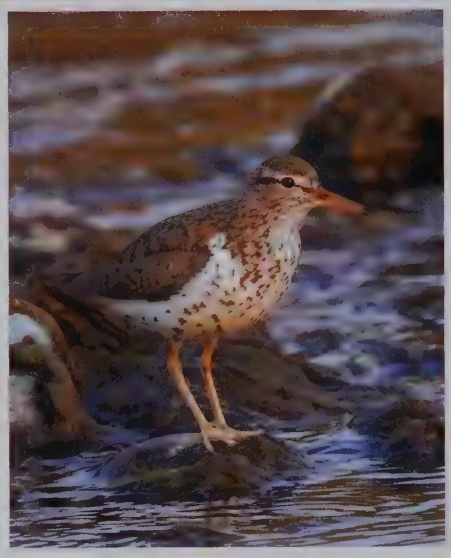
Habitat: Nests in dry grasslands; considered an indicator species for healthy native prairie; winters on South American pampas grasslands.

Worth knowing: Upland sandpipers are known for their remarkable flight displays and long-distance migrations to and from South America.

Best places to see them: Major refuges and along almost any valley road east of the Divide.

Montana conservation status: Stable but of concern from continued loss of grassland habitat; suffered from widespread unregulated market hunting in the early 20th century.

SMALL SHOREBIRDS (robin-size and smaller)



SPOTTED SANDPIPER

Brown-backed, solitary bird distinguished by yellow legs and frequent bobbing motion. Spots on white breast during breeding season. Body length: 7–8 inches.

▶ **Key ID tips: Short legs and neck compared to other shorebirds, and sporadic short bursts of flight when around other shorebirds.**

Habitat: Breeds near all types of aquatic habitats across most of North America and Canada. Winters in southern U.S. through Mexico and South America.

Worth knowing: Like Wilson's phalaropes, females practice sex role-reversal, attracting and mating with multiple males who assume parental care of eggs and young.

Best places to see them: Next to almost any body of water in Montana, especially along rivers, at most elevations.

Montana conservation status: Stable.

WILSON'S PHALAROPE

Delicate shorebird with slender neck and knitting needle–like bill. Drab gray except during breeding season, when female assumes rust-colored chest and a dark stripe from the bill through the eyes and down both sides of the neck. Body length: 9 inches.

▶ **Key ID tips: Small head and thin bill. Breeding female's distinct coloration noted above.**

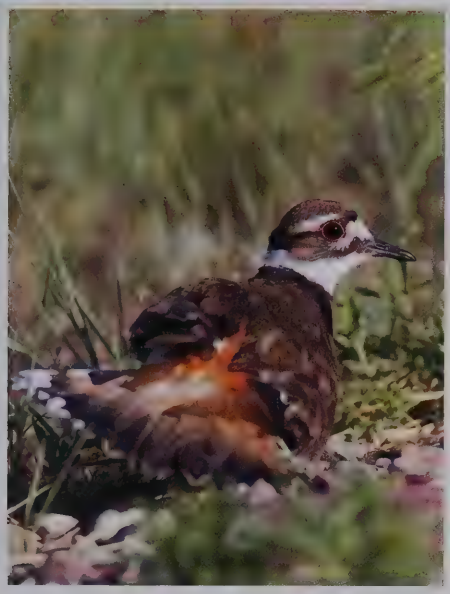
Habitat: Breeds across much of the northern U.S. and southern Canada in short grasslands next to wetlands; spends most of its time on water.

Worth knowing: Brightly colored females compete for males and "let" them assume parental care. Known for "twirling" on the water, a behavior thought to draw prey up from the depths.

Best places to see them: Major national wildlife refuges and almost any other open lakes, ponds, and potholes.

Montana conservation status: Stable but of concern due to major importance of key migration sites such as the Great Salt Lake.

CLOCKWISE FROM TOP LEFT SHARON DEWART-HANSEN; KIRT CUNNINGHAM; JULIE BETTS; SHARON DEWART-HANSEN; DONALD M. JONES; KERRY T. NICKOLL



KILLDEER

The most well-known shorebird. Brown back with two distinctive black collars across a white chest, vivid orange eye ring. Body length: 9 inches.

▶ **Key ID tips: Distinctive call when agitated. Dark collars on neck.**

Habitat: Year round in open habitats through much of the U.S; also breeds farther north and winters farther south. Usually nests on gravel including rooftops, parking lots, and roadsides.

Worth knowing: Killdeer are famous for pretending to have broken wings to lure predators away from eggs laid on open ground and newly hatched chicks.

Best places to see them: Lake shores, stream banks, fields, and other places close to water.

Montana conservation status: Common and widespread, but declining due to pesticides, habitat loss, and direct mortality from increasing numbers of vehicles and feral cats.

MOUNTAIN PLOVER

Drab brown, well camouflaged with pale breast and black wingtips visible in flight. Body length: 9 inches.

▶ **Key ID tip: Resembles a killdeer but without the black neck bands.**

Habitat: Dry upland bird known for association with prairie dog towns and similar, mostly open sites. Breeds east of the Rockies from southern Canada into New Mexico and Texas. Winters from California to central Mexico.

Worth knowing: Called the "prairie ghost" because of its habit of turning away from observers and sitting down, relying on its camouflage to "disappear."

Best places to see them: Backroads of Phillips, Valley, and Blaine counties; areas north of Harlowton and Roundup.

Montana conservation status: At risk because of small, declining populations and limited, declining habitat.

PIPING PLOVER

Pale brown-backed bird with orange legs, orange-and-black bill. Body length: 7 inches.

▶ **Key ID tip: Bill is paler, stockier, and stubbier than that of other shorebirds.**

Habitat: Breeds on shorelines of central Great Plains, Great Lakes, and north Atlantic coast. Winters mainly on south Atlantic and Gulf coasts.

Worth knowing: Facing a vulnerable population of fewer than 10,000 birds, scientists have made extensive efforts to tag, monitor, and protect piping plovers. Northeastern Montana provides a small but important breeding habitat for these birds.

Best places to see them: Alkali wetlands in Sheridan County, Medicine Lake, and Missouri River from Fort Peck Reservoir to the North Dakota border.

Federal conservation status: Near-threatened due to habitat destruction, flooding of human-controlled waters, beach recreation, predation, and trampling of eggs and chicks by people and cattle.

What goes there?

Following tracks can lead to a deeper understanding of wildlife—and the human mind.

By Doug Wadle. Illustrations by Liz Bradford

Trudging through knee-deep snow on the gentle shoulder of a long ridgeline, I make my way through underbrush in the Gallatin Mountains west of Livingston. The snow masks the sound of my boots in the quiet of the forest. The air is crystalline, graciously still. Heavy mounds of snow from the previous night's storm weigh down the Douglas fir branches. Hoar frost twinkles in the early morning sun, like tiny shards of broken glass sprinkled across the snow.

Winter's white canvas hides everything, and nothing. Animal signatures, a revealing peek into their private lives, are on full display. Mouse tracks run like stitches across a game trail. Wingtips from a startled ruffed grouse leave a snowy impression.

As a physician, I love the close approximation of tracking wildlife to the physical exam of people. Both require observation, pattern recognition, and critical thinking. Recognizing the salient amid the inconsequential requires the combined forces of the left and the right brain—the analytical and the creative.

To the uninitiated, a forest can appear chaotic, challenging the visitor to separate intentional signals from random noise. Overlapping tracks on a game trail may confound our senses. Deadfall is strewn like pick-up sticks across the hillside. A disorderly maze of mountain snowberry grows around the twisted bunchgrasses peeking up through the hoar frost. Filtering out the static requires an intimate knowledge of nature's baseline—what things might have looked like beforehand—and an eye for variation. It's like recognizing a patient's seemingly trivial diagonal earlobe crease as a marker of heart disease.

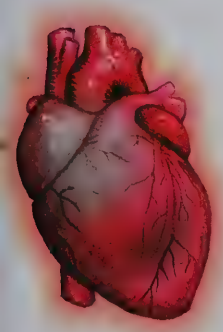
LIKE DETECTIVES

Animal tracking resembles putting together a complex jigsaw puzzle in which pieces from multiple puzzles are jumbled together, and some pieces are missing. Trackers are like detectives, Len McDougall wrote in *The Complete Tracker*, "gleaning facts from minute details and assembling them into a cohesive picture of what went on before." The tracks I follow this morning are relatively easy to decipher: fresh prints in fresh snow, a pearl necklace stretching across a snowy tapestry. The snow's depth obscures the individual tracks, but the pattern is unmistakable. I can picture the dime-size paws with five toes. With a little luck, I may catch a glimpse of the short-tailed weasel at the other end of this string. Weasels typically travel in a "two-by-two" bounding gait, the hind feet landing right where the front feet were just a moment before. A weasel's body, in deep

snow, leaves a thin drag mark between every other set of tracks, like a small dumbbell impression made at regular intervals.

Most animals, including humans, instinctively follow the path of least resistance, seeking the most efficient route whenever possible. Skunks, like some humans, stay in bed on stormy winter days, coming out only on the nicer afternoons to see the world and grab a snack. Bears and jumping mice completely sleep away winter. Bobcats step in their own tracks to lessen caloric expenditure and quiet their step. Coyotes travel long distances in straight lines, their energy-efficient trot only veering when finely tuned senses detect a new odor or a meadow vole's faint pitter-patter under the drifts.

But weasels! They know how to play in the snow. These sprightly furballs go out of their way to explore every single nook and cranny. The weasel I follow takes many sharp turns and diversions, visiting every tree trunk, rotting log, and tuft of grass in search of its next meal. Usually the goal is a vole, mouse, or pocket gopher, but sometimes weasels hunt ruffed, Franklin's (spruce), or dusky (blue) grouse or even snowshoe hares, which dwarf them in size and weight.



An ermine is what many of us call a short-tailed weasel in its winter white coat (though the name technically applies only to the stoat, a larger European relative). This sinuous, fur-covered dynamo with legs has a normal body temperature of 104.8 degrees F. and a heart rate that can reach 420 beats per minute. To sustain this super-charged metabolism, an ermine must consume three-quarters of its body weight in food every day. Nearly every waking moment is spent hunting.

An ermine's hunting success depends more on sheer energy and distance covered than on guile or strategy—I confess, a lot like my own elk hunting forays. The ermine I am trailing plays a literal game of pop-goes-the-weasel, diving under the snow only to emerge again 15 or 20 feet away. Its trail wanders past a couple of ruffed grouse beds, vacated before the predator's arrival. These birds survive in the worst weather. During cold and blustery blizzards, they comfortably huddle in insulated snow cocoons. After the storm passes, you can see where their three-toed tracks emerge from these improvised igloos. The grouse barely sink into the fresh snow, thanks to skinlike fringes called "pectinations" that develop along the sides of their toes in winter, turning their feet into snowshoes.

A Native Alaskan elder once told the cultural anthropologist Richard Nelson that animals know more than we do. Indeed, we could learn a thing or two from the grouse and the weasel. They don't hide from winter but rather embrace it. Most people, on the other hand, seek comfort at all costs. We dash from heated house to heated car to heated office. We complain if the thermostat gets bumped up a bit warm, then grab a sweater the moment the temperature drops even a degree or two below our preferred setting. We have contracted what retired Navy Seal, author, and ultra-athlete David Goggins calls "the disease of ease." It is hard to imagine we are the same hardy stock that flourished in bitter northern winters for countless generations. This incessant drive for easy living must have served us well in those uncertain times, but in today's high-tech world, constant cossetting and coddling have addicted us to physical comfort. The human hardware is the same, but our software has changed.

The Greek philosopher Epictetus said, "People with a strong constitution can handle extremes of hot and cold; people of strong mental health can handle anger, grief, joy and other emotions." I wonder if he had it backwards. Maybe those who brave temperature extremes and other discomforts are more likely to develop emotional resiliency. Or maybe not. The research on this is far from settled science. But as a medical doctor, I do know that humans are often not as fragile as we've been led to believe. Voluntary stressors—be they physical or mental—often don't weaken but fortify. Our bodies, like the weasel's, are machines of incredible efficiency designed to expend energy only for what is necessary. Nature's elegance stems not from

decoration, but from an expression of form's perfect fitness to function. The beauty of this design is that, as animals ourselves, we too are highly adaptable. To do so, however, we need to embrace the far edges of our comfort zone. Like spring tomato plants, we need occasional hardening off.

CAT TRACKS IN THE SIDEWALK

For all its devastation to our psyches and the many tragic deaths it caused and hastened, the Covid 19 pandemic also presented opportunity. It shoved many of us off the pleasure-seeking treadmill and out of our normal routines. I spent this time improving my tracking skills. Tracking combines the physician's powers of observation with the tenacity of an endurance athlete. It does not come easily. Like medicine, it is an art, a practice, never truly mastered. Eventually, though, my awareness expanded and I saw, heard, and smelled things I never noticed before.

I realized I was seeing the world differently when I found a set of fossilized house cat tracks in the cement steps on my back porch, left by some long-gone pet who stalked the neighborhood songbirds while World War I raged on the other side of the globe. I must have stepped over those impressions hundreds, if not thousands, of times—and had never seen them.

Back in the high country, a raven circles overhead before coming to rest atop an ancient snag. I focus on the concentric rings of disturbance enveloping the ermine and me. "Nothing can move in nature," Tom Brown wrote in *The Science and Art of Tracking*, "without affecting everything else." A red squirrel chitters away next to me. A mountain chickadee's alarm call rings out in the distance. The ermine's circle is getting closer to my own.

For many years, I did not appreciate that nature speaks a language of its own. My naïve ears struggled to distinguish various bird calls. I'm still a novice, but I have learned that birds make different calls in different situations. All of nature listens, and all of nature understands. Just watch how the elk or mule deer you are stalking takes notice after a Clark's nutcracker announces your presence. When the mountain chickadee's alarm call—*chicka-dee-dee-dee*—rang out, it was announcing the danger in its woods.

Montana's cities and towns also house a surprising array of wildlife. Even people not attuned to reading nature's book can't help but notice the signs all around them when they emerge from their cozy sanctuaries after a dusting of snow. The snow only makes evident what is always there. Though many people may not be able to read the book, they can certainly see the writing on the page. Like any other language, we must learn the patterns, shapes, and alphabet before we can start to read the words and understand entire stories. The wonderful thing about nature's novel, Jim Corbett wrote in *Jungle Lore*, is that it has no beginning and no end: "Open this book where you will...and no matter how long or how intently you study the pages your interest will not lag, for in nature there is no finality."

One morning, coming out of my house to a fresh skiff of snow, I noticed that a raccoon had made its rounds. The handlike prints led me down the alley to a wind-tipped garbage bin before meandering down to the river, where I lost its trail among the gnarled cottonwoods. There, in the river's shallows, I spotted a huge heron track preserved in the mud under a thin layer of ice, an art print set behind glass. Beauty is all around us, but we are often shockingly inattentive in familiar surroundings. It is not the seeing so much as it is the noticing.

LEARNING TO NOTICE

David Hubel and Torsten Wiesel won the Nobel Prize for Physiology or Medicine in 1981 for shedding light on why we are so blind to unfamiliar patterns. It turns out that our visual cortex, what they termed "receptive fields," develops according to how it is stimulated. For instance, kittens exposed only to horizontal lines become selectively blind to vertical lines. The poor creatures bumped into chair legs they could not see and struggled to navigate even simple environments. But the study implied that seeing can be learned. Our

Doug Wadle is a doctor of internal medicine and the author of Einstein's Violin: The Love Affair between Science, Music, and History's Most Creative Thinkers. *He lives in Livingston. Liz Bradford is a scientific illustrator based in North Carolina.*

visual processing system is directly influenced by, and adapts to, the qualities of our prior experiences. The art of tracking is the art of learning to notice. The fossilized cat tracks in my back porch remind me every day of how many things I have unknowingly looked right past. What else might I be blind to?

Modern humans are particularly prone to optical illusions. Like M.C. Escher's staircases, even after we learn the trick, we still can't stop seeing the false images. These visual deceptions are proof that seeing goes on more in our brains than our eyes. This gullibility is not, however, a universal human trait. Instead, it is the result of our culturally influenced receptive field development. Adam Alter, in his book *Drunk Tank Pink*, relates that the indigenous San people of southwestern Africa and other tracking societies have surprisingly little trouble with visual illusions. The San are masterfully observant of the seemingly trivial. Paying attention to small details is key to their survival. "We must learn to use our eyes in a new way," British naturalist Hugh Falkus wrote, "or rather, in a very old way, the way of our ancestral hunters."

Our survival may no longer depend on these details, but they do inspire joy. The poet Rainer Maria Rilke lamented that "most people have no idea how beautiful the world is and how much magnificence is revealed in the tiniest things, in some flower, in a stone, in tree bark, or in a birch leaf." When we start minding the minutiae, we stop missing the magnificent.

Tracking has been called the oldest science by Louis Liebenberg, associate professor of human evolutionary biology at Harvard University. "Hunting involves cultural adaptations that give the hunters an advantage over their prey," he wrote. As our ancestors investigated animal tracks, they made hypotheses about their meaning. Eventually they found out whether they were right or wrong: They found the animal or they didn't. Either way, they learned something.

This is the basis of the scientific method: Notice and deduce, hypothesize and test, over and over. It is fundamentally a process of creative problem-solving, as important to tracking as it is to math and physics. Modern physicists seek to read the signs of things like atomic and gravitational forces that can't be seen. Liebenberg maintains that it is not the tracker who thinks like a physicist but the other way around.

In the mountain forest, a movement catches my eye. It is the ermine, sitting upright on the snow, looking right at me, a vole hanging out both sides of its mouth. We share a glance for a few long seconds, then it is off again, black-tipped tail waving like a flag. Always looking, always smelling, always, most of all, moving. Soon it disappears into the tangle of doghair pines growing in an old burn. It is time for me to go as well, and I leave the ermine to its solitary rounds and track my own footprints back to the truck.

The Freeze Baby

By Tom Dickson

I'm not embarrassed to admit this: I get cold easily.

Okay, maybe a bit embarrassed. Montanans—guys especially—are supposed to endure the cold without whining. Not me. I'm shivering as I write this, and I'm in my office with the heat turned up.

I've always been sensitive to cold. Maybe it's because of where I grew up. No, not Florida. I was raised in Minnesota, where it's colder than Montana most of the time. As kids, we all wore jeans and cotton long underwear and played outside all winter—snowball fights, sledding, pond hockey. Our jeans would get soaked then freeze, and we'd have to walk around like the Tin Man in *The Wizard of Oz*.

The coldest we got was when skating. After about an hour, our toes and fingers would go numb, and it would be bearable until we went to the warming house. As our toes and fingers started to thaw, we'd be hit with such an excruciating pain that we'd have to rush back outside to numb things up again.

I think all that freezing and thawing over the years destroyed my digits.

These days I own six pairs of gloves that get increasingly warmer for every 5 degrees it drops, starting at about 40 degrees F. At 10 degrees I switch to mittens, then to down mittens at 0 and finally down gloves inside down mittens at -10 degrees. Below that I just scrunch my fingers into fists and whimper.

I recognize that mittens aren't manly. I was wearing them at a gas station in Cascade on a cold morning this past winter. As a rancher walked past, wearing no gloves or hat, he gave me a withering look. I'm used to it.

I don't think it has to do with pain tolerance. Studies have verified what women have always known, that most of them get colder than men do. (A sweatshirt I once bought for my sister reads: "Yes, I'm cold. I'm always cold.") The main reason, scientists say, is that men have a higher metabolic rate and more muscle mass, so their bodies act like portable space heaters.

It's definitely not because women are wimps. Those I know who've given birth tell me it's more agonizing than a severe burn or a broken bone. And some of them actually did it again.

As for me, I've broken my right leg twice, had a hip replaced, and had 12 teeth pulled. I'm familiar with pain. Even so, maybe I am just a cold-weather wuss after all, what we kids called a freeze baby. But I think it's just that my body generates less heat than most guys. In January, I see high schoolers wearing shorts, and white-bearded retirees standing in the Costco parking lot in nothing but shorts and a sweatshirt. It's like their legs are so warm they can't bear to wear long pants, even in winter.

But fashion has always taken casualties. A popular look these past few years, even in winter, has been women wearing shoes with no socks. I even saw a sockless woman downtown, doing her Christmas shopping, on December 21, the day it dropped to -34 degrees here in Helena. I have to say that if you're cold in that getup, you get no sympathy from me.

Meanwhile, I looked like the Stay Puft Marshmallow Man from the *Ghostbusters* franchise: Sorel boots, snowmobile overalls, hooded Antarctica-grade down parka, and a wool scarf wrapped twice around my face and head. I realized as I set out for work that day that I could not dress any warmer. And I was still freezing. The only thing that kept me going was gratitude I didn't live in Elk Park, located a few miles northeast of Butte, where the NOAA weather website said it had dropped to -49 degrees, making it the coldest spot in the nation.

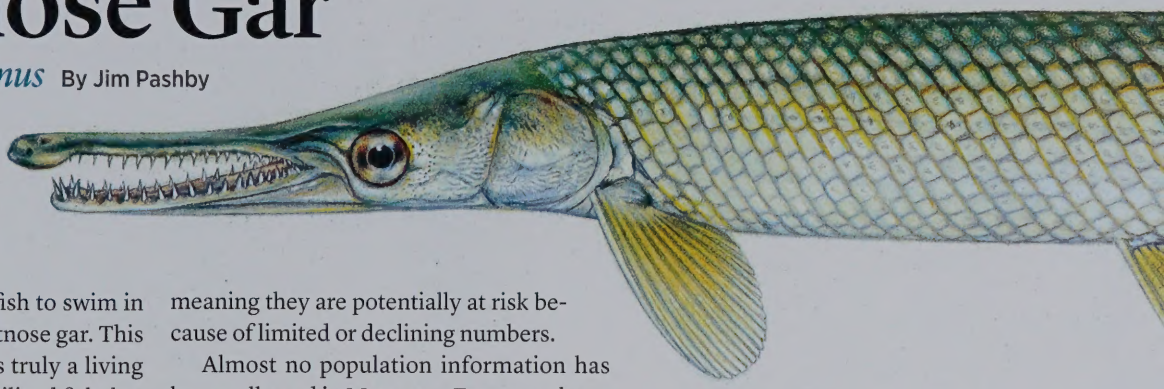
I don't know what the guys down there were wearing that morning, but I hope it wasn't shorts.

Tom Dickson is the Montana Outdoors *editor.*

ILLUSTRATION BY STAN FELLOWS

Shortnose Gar

Lepisosteus platostomus By Jim Pashby



One of the strangest fish to swim in Montana is the shortnose gar. This primitive creature is truly a living fossil, closely resembling fossilized fish that date back hundreds of millions of years. Even if none of us ever catches one in the few waters where they swim, or spots one in the clear waters below Fort Peck Dam, just knowing about this amazing species adds to our appreciation of the vast diversity of aquatic life in Big Sky Country.

IDENTIFICATION

You'd never mistake a shortnose gar for any other fish species. These olive-green to brown predators have a long, torpedo-like body covered in a sheath of small, interlocking, diamond-shaped plates that bend and flex as the fish moves, like a medieval suit of chain mail. Hard as tooth enamel, gar "scales" were once used by some American Indian tribes to tip their arrows. In southern states, the skins of larger gar species like the alligator gar were sometimes used to cover wooden plows before steel blades became widely available.

Another unique feature of the shortnose gar is its long snout lined with rows of conical, needle-sharp teeth. The tail fin is rounded and marked with several dark spots. Like a northern pike, the only fish it even vaguely resembles, the gar has a dorsal fin far back on its body, allowing it to accelerate forward with lightning speed to grab unsuspecting prey in its toothy jaws.

RANGE

Most shortnose gar live in the Mississippi River Basin from the Twin Cities south to the Gulf of Mexico. But the species also ranges up the Missouri as far as Montana. They are listed as a species of concern in Montana, meaning they are potentially at risk because of limited or declining numbers.

Almost no population information has been collected in Montana. For years shortnose gar were thought to swim only in a few artificial ponds near Glasgow called the Dredge Cuts. In a 1980 *Montana Outdoors* article, Montana fisheries expert George Holton wrote that only one other record had ever come from the Missouri River proper, a fish caught in 1979 downstream of Fort Peck Dam, at the mouth of Little Porcupine Creek. But in recent years, FWP crews conducting fish surveys have netted shortnose gar specimens on the Yellowstone River 70 miles upstream from its confluence with the Missouri, roughly 10 miles upstream in the Milk River, and on the lower Missouri near Bainville, indicating its range here is greater than previously thought.

CHARACTERISTICS

The shortnose gar is the only fish in Montana that can actually breath air by lifting its snout above water and taking gulps. The fish processes oxygen from the atmosphere in its gas bladder, allowing it to survive in water practically devoid of oxygen. In other states, this indomitable fish has been known to live 24 hours or more completely out of water.

Females lay bright green poisonous (to humans) eggs in shallow, weedy bays and backwaters that warm to over 70 degrees F. The young often lie in groups at the water surface, looking like floating black matchsticks.

SCIENTIFIC NAME

Lepisosteus is a combination of the Greek *lepiss* for "scale" and osteon for "bone," while *platostomus* comes from the Greek words *platy*, meaning "flat," and *stomus*, meaning "mouth."

HABITAT

These are fish of clear, quiet river pools and open, silty rivers, where they laze in still waters waiting for minnows and other finned prey.

ANGLING

Shortnose gar are tough to catch because hooks can rarely penetrate their hard, bony mouth. But occasionally an angler using especially sharp lures can get a good hookset. Some fly anglers catch the fish with "rope" flies, consisting of a 4-inch piece of unraveled nylon rope—no hook required—slowly stripped across the water surface in hopes that an attacking gar gets a tooth or two caught in the frayed fibers long enough to bring it in to the net.

In Montana, shortnose gar can grow to over 7 pounds and 34 inches long. In southern states, shortnose gar up to 13 pounds have been taken. Those states also hold alligator gars, a relative of the shortnose that can weigh more than 300 pounds and reach more than 8 feet long.

Gar caught on a fly in the Dredge Cuts near Glasgow.

Jim Pashby is a writer in Helena.

ILLUSTRATION BY JOSEPH TOMELLERI; PHOTO BY NATHAN COOPER

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THE **OUTSIDE** IS IN US ALL.

Whether it's by fishing, camping, hiking, mountain biking, wildlife watching, or **spring turkey hunting in eastern Montana,** ours is a state where everyone can find their own special way to connect with the natural world. Around here, **the outside is in us all.** PHOTO BY LISA BALLARD

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